



Gladman Developments Ltd

Land at Littlebourne, Canterbury

Flood Risk Assessment & Outline Surface Water Drainage Strategy

680117-R1(01)-FRA

February 2023



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RSK GENERAL NOTES

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1 INTRODUCTION

1.1 Context

RSK Land and Development Engineering Ltd were commissioned by Gladman Developments Ltd (the client) to provide a Flood Risk Assessment (FRA) to support the outline planning application at Land at Littlebourne, Canterbury (the site). Development proposals include the development of residential dwellings.

The purpose of the FRA is to establish the risk associated with the proposed development and to propose suitable mitigation, if required, to reduce the flood risk to a more acceptable level. The FRA must demonstrate that the development will be safe for its lifetime (in this case assumed to be 100 years) taking account of the vulnerability of its users, without increasing flood risk elsewhere.

This document has been produced to assess the flood risk from tidal, fluvial, surface water, groundwater, sewer and artificial sources in line with the National Planning Policy Framework (NPPF)¹ and its corresponding Planning Practice Guidance (PPG)². It includes a summary of the proposed surface water drainage strategy, showing how Sustainable Drainage Systems (SuDS) have been used to demonstrate surface water is appropriately managed on-site, with the aim that there is no increased risk of flooding on-site or elsewhere as a result of the development.

This assessment has been undertaken in consultation with the relevant authorities, and with reference to data, documents and guidance published by the Environment Agency (EA), the Lead Local Flood Authority (LLFA) (Kent County Council), the Local Planning Authority (LPA) (Canterbury City Council), and the Water Authority (Southern Water).

1.2 Scope of work

A key element of project development is to prepare a FRA to establish the flood risk associated with the proposed development and to propose suitable mitigation, if required, to reduce the risk to a more acceptable level.

The scope of work relating to a FRA is based on the guidance provided in Section 14 of the NPPF and its accompanying Planning Practice Guidance.

The key definitions within the PPG are:

- “Flood risk” is a combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on

¹ Communities and Local Government, ‘National Planning Policy Framework’, published March 2012 and last updated July 2021.

² Communities and Local Government, ‘Planning Practice Guidance - Flood Risk and Coastal Change, ID 7’, published March 2014 and last updated August 2022.
[http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/..](http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/)

the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources; and

- “Areas at risk of flooding” means areas at risk from all sources of flooding. For fluvial (river) and sea flooding, this is principally land within Flood Zones 2 and 3. It can also include an area within Flood Zone 1 which the Environment Agency has notified the local planning authority as having critical drainage problems.

For this site, the key aspects that require the assessment are:

- The Environment Agency’s indicative flood zone map shows that the site is located within Flood Zone 1; and,
- The site area is 15.77Ha therefore surface water drainage must be considered, and sustainable drainage systems (SuDS) incorporated, where possible.

A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. The scope of this assessment therefore comprises the following elements:

- To review architect plans, planning information and other studies to determine existing site conditions;
- To obtain information on the hydrology and hydrological regime in and around the site;
- To obtain the views of the Environment Agency/LLFA/IDB including scope, location and impacts;
- To determine the extent of new flooding provision and the influence on the site;
- To assess the impact on the site from climate change effects and anticipated increases in rainfall over a 100 year period for residential uses;
- To review site surface water drainage based on the proposed layout and, if necessary, to determine the extent of infrastructure required; and
- To prepare a report including calculations and summaries of the source information and elements reviewed.

Reliance has been placed on factual and anecdotal data obtained from the sources identified. RSK cannot be held responsible for the scope of work, or any omissions, misrepresentation, errors or inaccuracies with the supplied information. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

2 SITE DESCRIPTION & PROPOSALS

2.1 Existing site

Site Address: Land to the south of ‘The Hill’,
Evenhill
Littlebourne
CT3 1TA (Nearest)

Site National Grid Reference: 620390E , 157400N

The site is located to the west of Littlebourne Village, Kent and can be located at National Grid reference 620390E, 157400N. The Site boundary and current site layout are shown on **Figure 2.1**.

Table 2.1, below, provides a description of the immediate surroundings of the site.

Table 2.1: Site setting

Direction	Characteristic
North	Bounded by the A257. Residential properties, public house (The Evenhill), B&B (Cedar Lodge) lie to the north of the A257. Open green fields/agricultural land lie beyond.
East	Northeast – bounded by an unnamed vehicular access track, detached residential properties with associated private gardens. Littlebourne Village centre beyond. Southeast – bounded by Bekesbourne Lane with open green fields/agricultural land beyond.
South	Howletts Wild Animal Park, with open green fields/agricultural land beyond.
West	Unbound (i.e. no physical boundary), open green fields/agricultural land believed to be associated with the subject site.



Figure 2.1: Site location map

2.1.1 Land use and topography

The Site comprises a broadly 'L' shaped plot of land covering an area of approximately 15.77Ha. The site comprises open agricultural fields, believed to be arable land use. The site is informally divided into two parcels of land (north and south), by a centrally located surface water drainage ditch traversing through the centre of a site in an west-east direction.

The topography of the site has been assessed using the topographic survey available in **Appendix B**. Site topography generally falls west (~30 mAOD) to east (~20 mAOD). Mature trees are present along the site boundaries to varying degrees alongside semi-mature and mature hedgerows.

As the site is undeveloped the site is considered as greenfield.

2.1.2 Existing drainage

A shallow surface water ditch (~1 m), intersects the middle of the site, flowing in an easterly direction towards the site boundary. At the site boundary, the surface water flows northwards within a ditch discharging into a 225mm Dia pipe situated within a shallow headwall leading beneath the adjacent A257.

The existing drainage on site and in the immediate surroundings has been assessed using the topographic survey (**Appendix B**), the public sewer records (**Appendix C**), the drainage details are as follows:

- There are no public sewers within the site boundary;
- The closest sewer is the foul sewer to the north along The Hill (A257);
- A foul rising main runs along the southwestern and northwestern boundary of the site;
- Highway gullies were noted within The Hill. It is unknown where gullies discharge to, however there were no observable highway ditches seen along the site boundary.
- Surface water runoff from the site will gravitate towards the ditch to the north east of the site.

2.2 Development proposals

The proposed development is for a residential end use. The current proposed development framework shows that 9.17Ha of the 15.77Ha site will be developed. The developable area will contain a variety of dwellings, driveways, gardens and access highways. Of this development area an impermeable area of 50% has been assumed. The remaining area will be areas of public open space and soft landscaping.

The approximate land uses of the proposed site are summarised in **Table 2.2** below.

Table 2.2: Proposed site land uses

Land use	Area (Ha)	Percentage of Developable Area (%)	Percentage of Total Site (%)
Impermeable	4.585	50	29.1
Permeable	4.585	50	29.1
Total Developable Area	9.17	100	58.2
Remaining Greenfield Area	6.60	N/A	41.8
Total Site Area	15.77	N/A	100.0

3 ENVIRONMENTAL SETTING

3.1 Hydrology

3.1.1 Main River

The closest EA designated 'Main River' is the Little Stour located approximately 500m to the east of the site.

3.1.2 Ordinary watercourse

The nearest ordinary watercourse is a drainage ditch located within the site boundary flowing from offsite, crossing the site in an easterly direction before running along the eastern boundary in a northerly direction towards The Hill, (Photo 3.1).



Photo 3.1: Watercourse along eastern boundary

The watercourse enters a 225mm Dia. culvert flowing under The Hill. The onwards route is unknown and may require further investigation.

3.1.3 Geology

3.1.3.1 Desk Study

According to British Geological Surveying mapping, the underlying geology on the site can be described as the following:

- Superficial Geology: Head - Clay And Silt. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by subaerial slopes
- Bedrock Geology: Tunbridge Wells Sand Formation - Siltstone, Mudstone and Sandstone. Sedimentary Bedrock formed approximately 134 to 139 million years ago in the Cretaceous Period. Local environment previously dominated by swamps, estuaries and deltas.

BGS Borehole data records were searched for nearby trial/borehole logs that may give relevant information regarding the on-site geology. There are no relevant borehole logs on or directly adjacent to the site. Other nearby boreholes confirm the geology in the area with groundwater strike at 4m bgl in a borehole taken from Little Court, a site approximately 250m to the east of the site where ground levels are in the region of 12m AOD.

3.1.4 Hydrogeology

Hydrogeological classification information was obtained from the online 'Magic Map' service. The underlying bedrock is designated as a Secondary A Aquifer. There are no designated superficial aquifers underlying the site.

Mapping shows the eastern section of the site is partially located within a Groundwater Source Protection Zone 3. A Zone 3 area is defined as the total area needed to support the abstraction or discharge from the protected groundwater source.



Figure 3.1: Source Protection Zone (blue shading shows Zone 3)

4 LEGISLATION, POLICY AND GUIDANCE

4.1 National policy

Table 4.1: National legislation and policy context

Legislation	Key provisions
National Planning Policy Framework (2021)	The aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.
Planning Practice Guidance (2022)	The NPPF is supported by an online Planning Practice Guidance, which provides additional guidance on flood risk.
Flood and Water Management Act 2010 ³	The Flood and Water Management Act (FWMA) aims to implement the findings of the 2007 Pitt Review and co-ordinate control of drainage and flood issues. There are a number of increased responsibilities within the Act that affect adoption of SuDS features and the role of the EA to expand on the mapping data they provide. The implementation of SuDS features has many beneficial impacts on the treatment of surface water during remediation works.
Water Resources Act 1991 ⁴	Section 24 – The EA is empowered under this Act to maintain and improve the quality of ‘controlled’ waters Section 85 – It is an offence to cause or knowingly permit pollution of controlled waters Section 88 – Discharge consents are required for discharges to controlled waters
Water Framework Directive (2000) ⁵	The Water Framework Directive (WFD) requires all inland and coastal waters to reach ‘good’ chemical and biological status by 2015. Flood risk management is unlikely to have a significant impact on chemical water quality except where maintenance works disturb sediment (such as de-silting) or where pollutants are mobilised from contaminated land by floodwaters. The main impact of the WFD on flood risk management, both now and in the future, relates to the ecological quality of water bodies. Channel works, such as straightening and deepening, or flood risk

³ Flood and Water Management Act, 2010

⁴ Water Resources Act, 1991

⁵ EU Water Framework Directive, 2000

Legislation	Key provisions
	management schemes that modify geomorphological processes can change river morphology. The WFD aims to protect conservation sites identified by the EC Habitats Directive and Birds Directive that have water-related features, by designating them as 'protected sites'.

4.2 Local policy

Table 4.2: Local policy legislation and policy context

Legislation	Key provisions
Canterbury District Local Plan adopted July 2017	<p>Policy CC4 Flood Risk Development proposals within Flood Zones 2 and 3 and sites larger than 1 ha in Flood Zone 1 shall be subject to a Flood Risk Assessment. The Flood Risk Assessment shall be in accordance with the Council's Drainage Impact Assessment Guidance Note and Strategic Flood Risk Assessment, including the requirement for a contribution towards any necessary new flood defence or mitigation measures. Where relevant, the assessment should also address the risk of flooding from surface water, groundwater and ordinary watercourses. Where there is evidence that water from these sources ponds or flows over the proposed site the assessment should state how this will be managed and what the impact on neighbouring sites will be. Measures identified to mitigate effects shall be installed and maintained at the developers' own expense or put into a management company to ensure their long term retention, maintenance and management. Other flood resilient and/or resistant measures may also be required, and their provision will be informed by the findings of a submitted Flood Risk Assessment.</p> <p>Policy CC5 Flood Zones On sites that have not been previously developed within the Environment Agency's Zones 2 and 3, new development will only be permitted if it can be demonstrated that it satisfies the requirements of the Sequential Test and, where required, the Exception Test. Extensions to existing property and change of use must meet the requirements of flood risk assessments.</p> <p>Policy CC6 Minor Development and Development of Previously Developed Land Within Flood Zones Minor infill development and development on previously developed land within Zones 2 & 3 as defined by the Environment Agency as shown on the Proposals Map (see also all insets), will be permitted subject to the provisions of other Local Plan policies. Each case shall be treated on its own merits on the particular circumstances that apply having regard to the risks attached.</p>

4.3 Relevant studies

Table 4.3: Relevant studies

Study	Comments
<p>PFRA: Kent County Council Preliminary Flood Risk Assessment September 2011</p>	<p>Preliminary Flood Risk Assessments are produced by Lead Local Flood Authorities (LLFAs) in England and Wales. A Preliminary Flood Risk Assessment (PFRA) is the first part of the planning cycle for flood risk management as set out in the Flood Risk Regulations (2009), which implement the requirements of the European (EU) Floods Directive (2007). The EU Floods Directive aims to provide a consistent approach to managing flooding across Europe.</p> <p>The PFRA is organised by the River Basin District (in this case the South East River Basin District) and produced by the LLFA (in this case KCC). The PFRA considers local sources of flooding that the LLFA is responsible for: surface runoff, groundwater and ordinary watercourses. Information is gathered from existing sources on past floods and flood models to identify Flood Risk Areas.</p> <p>The PFRA concludes that whilst several flood events have been recorded in the past, there are no records of severe events with more than 1,000 properties impacted.</p>
<p>CFMP: River Stour Catchment Flood Management Plan Summary Report December 2009</p>	<p>Catchment Flood Management Plans (CFMP) give an overview of the flood risk from inland sources across each river catchment and recommend ways of managing those risks now and over the next 50-100 years. The Environment Agency is responsible for producing CFMPs.</p> <p>The site falls within the 'Nailbourne and Little Stour' sub-catchment and the policy applicable to this site is Policy Option 4 which states 'areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change.'</p> <p>It is noted that the greatest risk to people and property in this sub-area is from surface water flooding due to the drainage network being overwhelmed during heavy rainfall.</p> <p>Proposed actions to implement the preferred policy include: Carry out groundwater study focusing on understanding the influence of groundwater on the Nailbourne and the Little Stour and exploring options to reduce the expected increase in flood risk due to climate change.</p>
<p>SFRA: Canterbury City Council August 2011</p>	<p>The principle aim of the SFRA was to map all forms of flood risk in order to provide an evidence base to locate new development. It also aims to provide appropriate policies for the management of flood risk and identify the level of detail required for site-specific FRAs. The SFRA contains information and maps detailing flood sources and risks.</p>

Study	Comments
	The site is not referred to specifically within the SFRA though flooding of Littlebourne has been experienced in the past.

5 SOURCES OF FLOOD RISK

5.1 Criteria

In accordance with the NPPF and advice from the EA, an assessment of the risk associated with various flooding sources is required along with consideration of the effects of climate change over the design life of the development (in this case assumed to be 100 years).

The EA's most recent climate change guidance, published in May 2022⁶, should be referenced in order to identify the appropriate peak river flow and rainfall intensity allowances for the scheme. The appropriate allowance for peak river flow is based on the site's location in the country, the lifetime of development, the relevant flood zone and the vulnerability of the proposed end use.

The flood risk elements that need to be considered for any site are defined in BS 8533 'Assessing and managing flood risk in development Code of practice'⁷ as the "Forms of Flooding" and are listed as:

- Flooding from rivers (fluvial flood risk);
- Flooding from the sea (tidal flood risk);
- Flooding from the land;
- Flooding from groundwater;
- Flooding from sewers (sewer and drain exceedance, pumping station failure etc); and
- Flooding from reservoirs, canals and other artificial structures.

The following section reviews each of these in respect of the subject site.

5.2 Definitions of Risk

Table 5.1: Flood Map for Planning Risk Zoning

Flood Zone	Description
Flood Zone 1	Land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)
Flood Zone 2	Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year

⁶ Environment Agency, 'Guidance: Flood Risk Assessments: Climate Change Allowances'. <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>, May 2022.

⁷ BSI, 'BS 8533-2017 Assessing and managing flood risk in development Code of practice', December 2017.

Flood Zone	Description
Flood Zone 3	Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 3b	Land having the potential to flood for storm events up to the 1 in 30 year return period (>3.3% annual probability of flooding occurring). It is classified as 'functional floodplain'

Table 5.2: Flood Risk from Rivers or the Sea and Flood Risk from Surface Water

Flood Risk	Description
High	High risk means that each year this area has a chance of flooding of greater than 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.
Medium	Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.
Low	Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.
Very Low	Means that each year this area has a chance of flooding of less than 0.1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

Table 5.3: Flood Risk category matrix from Reservoirs, Groundwater, sewers and other artificial sources

Threat Probability	Low Impact	Medium Impact	High Impact
High	Medium	Medium	High
Medium	Low	Medium	Medium
Low	Low	Low	Medium
Very Low	Very Low		

5.3 Flooding from rivers (fluvial flood risk)

5.3.1 Main Rivers

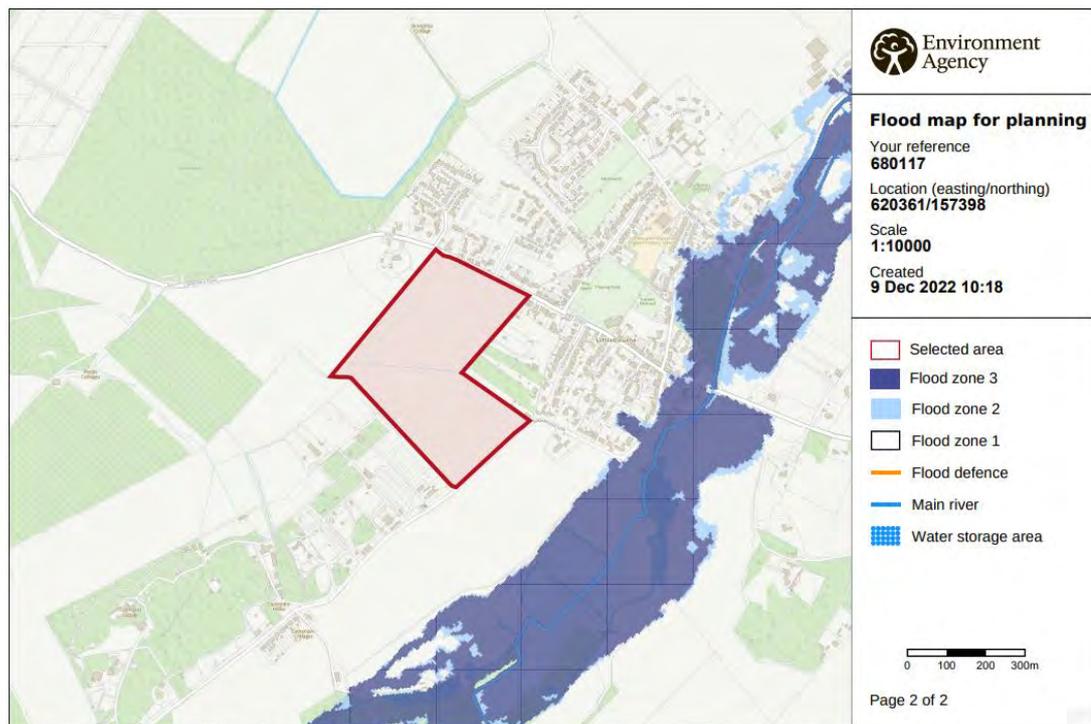
The EA Flood Zone mapping study for England is available on their website at: <https://flood-map-for-planning.service.gov.uk>.

The latest EA published flood zone map (**Figure 5.1**) shows that the site lies within Flood Zone 1.

In December 2013, the EA released an additional form of mapping 'Risk of Flooding from Rivers and Sea', which is available at:

<https://flood-warning-information.service.gov.uk/long-term-flood-risk>

The latest 'Risk of Flooding from Rivers and Sea' flood map (**Figure 5.2**), which shows the EA's assessment of the likelihood of flooding from rivers and the sea at any location and is based on the presence and effect of all flood defences, predicted flood levels, and ground levels, indicates that the site is designated as 'very low' risk of flooding.



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Figure 5.1: Environment Agency 'Flood map for planning'

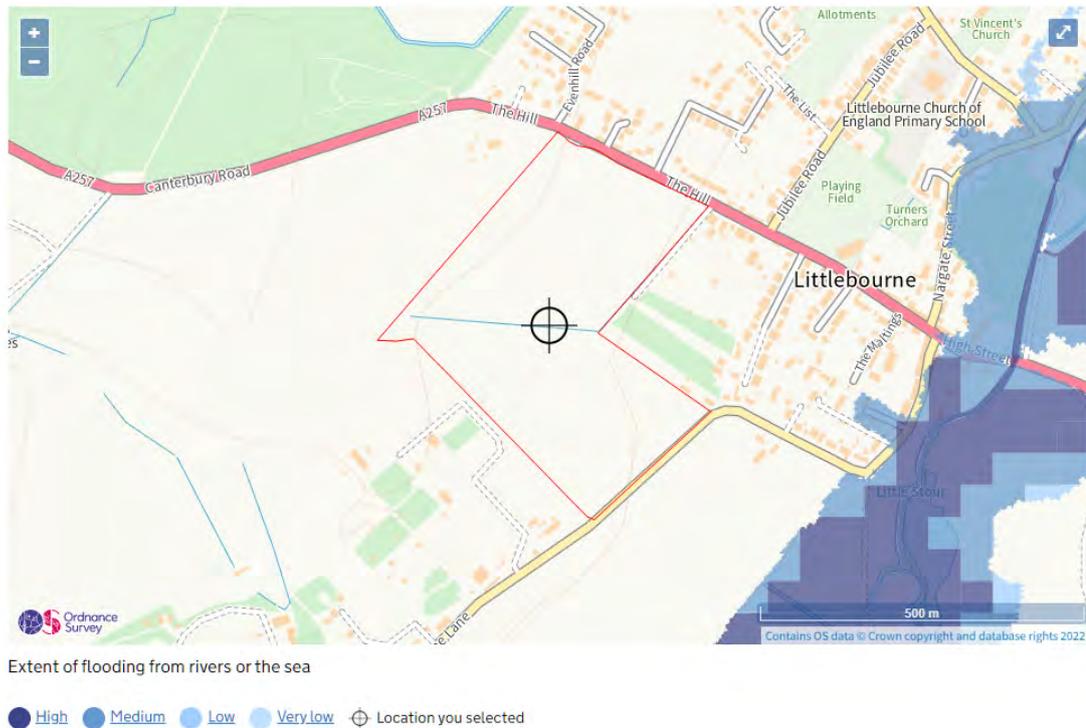


Figure 5.2: Environment Agency 'Flood risk from rivers or the sea' map (accessed December 2022)

5.3.2 Climate Change

Fluvial flooding is likely to increase as a result of climate change. A greater intensity and frequency of precipitation is likely to raise river levels and increase the likelihood of a river overtopping its banks. Climate change guidance for river modelling was updated by the EA in May 2022. No model re-runs have been undertaken as part of this site-specific FRA.

As the site is significantly above the 0.1% flood level then climate change is not considered a risk to the proposed development.

5.4 Flooding from the sea (tidal flood risk)

The site is not considered to be at risk from tidal flooding due to its inland location and elevated position indicating a **'very low'** risk of flooding.

5.4.1 Climate change

Climate change is not considered to result in an increased risk of tidal flooding to the site.

5.5 Flooding from the land (surface water flood risk)

If intense rain is unable to soak into the ground or be carried through manmade drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff can occur. Excess surface water flows from the site are believed to drain naturally to the local water features, either by overland flow or through infiltration.

The EA's surface water flood map (**Figure 5.3**) shows the site is typically at a very low risk from pluvial flooding with some limited risk confined around the shallow ditch on site. **Figure 5.4** shows the flood depth mapping for the 100 year event, it can be seen from this that the limited areas of risk are less than 300mm in depth and limited to the on site ditch flowing a easterly direction.

The risk of surface water flooding to the development is typically considered to be **very low**.

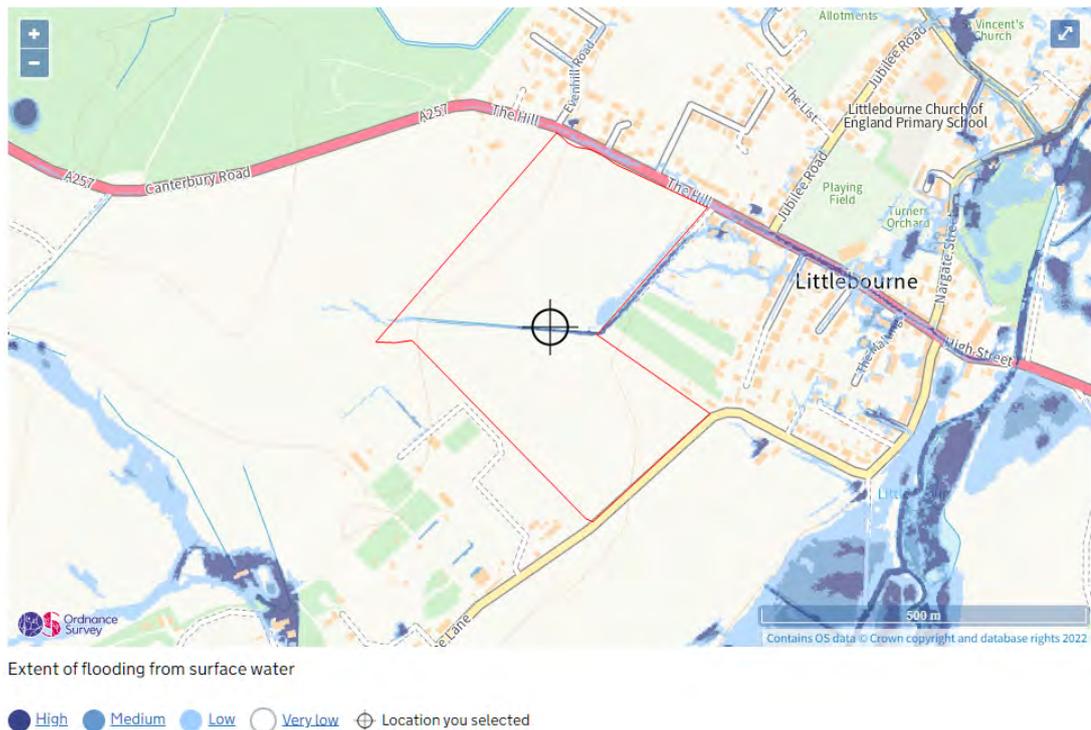
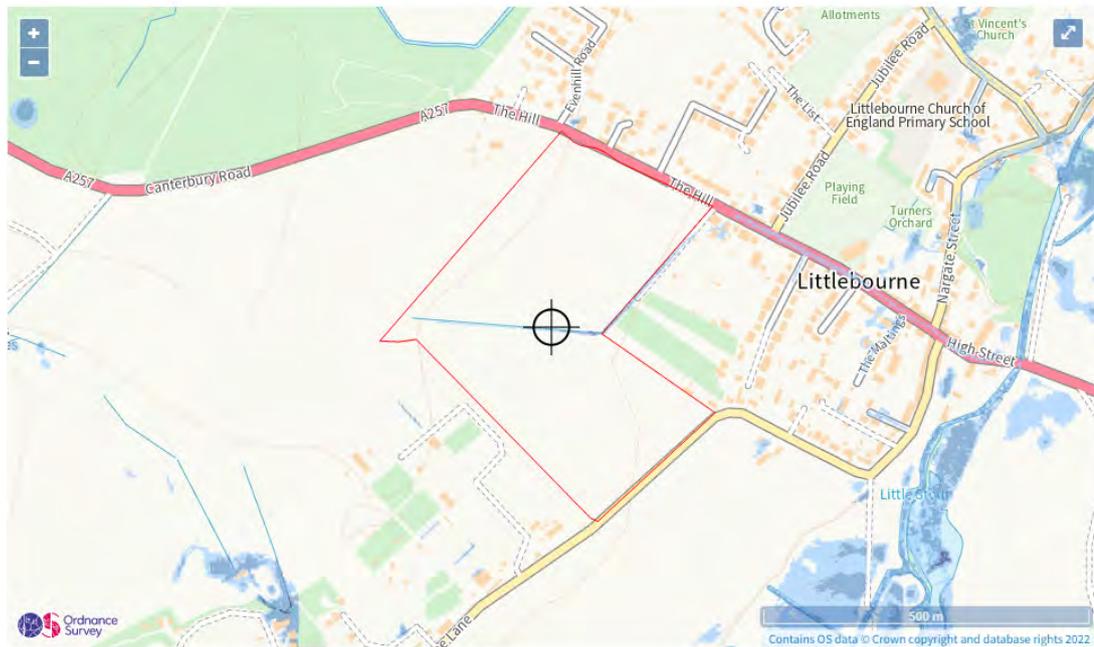


Figure 5.3: Environment Agency 'Flood risk from surface water' map (accessed December 2022)



Surface water flood risk: water depth in a medium risk scenario
 Flood depth (millimetres)
 ● Over 900mm ● 300 to 900mm ● Below 300mm ⊕ Location you selected

Figure 5.4: Environment Agency ‘Flood risk from surface water’ Medium Risk depth map (accessed December 2022)

5.5.1 Climate change

Surface water flooding is likely to increase as a result of climate change in a similar ratio to fluvial flooding. Increased intensity and frequency of precipitation is likely to lead to reduced infiltration and increased overland flow. Climate change guidance for rainfall intensity has recently been updated by the EA in May 2022. Revised allowances for climate change have been included in the indicative drainage strategy (refer to Section 8).

5.6 Flooding from groundwater

Groundwater flooding tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

It is understood from the CFMP that the Little Stour and Nailbourne catchment is influenced by groundwater. The Nailbourne flows infrequently (about every seven years) after prolonged rainfall. The Nailbourne and Little Stour are groundwater fed. High

groundwater levels increase flood risk by raising baseflows in rivers and can result in flows from spring lines away from the rivers. Data taken from the Envirocheck report (Figure 5.5) based on BGS data confirms that the site lies in an area outside of that at potential risk of groundwater emergence.

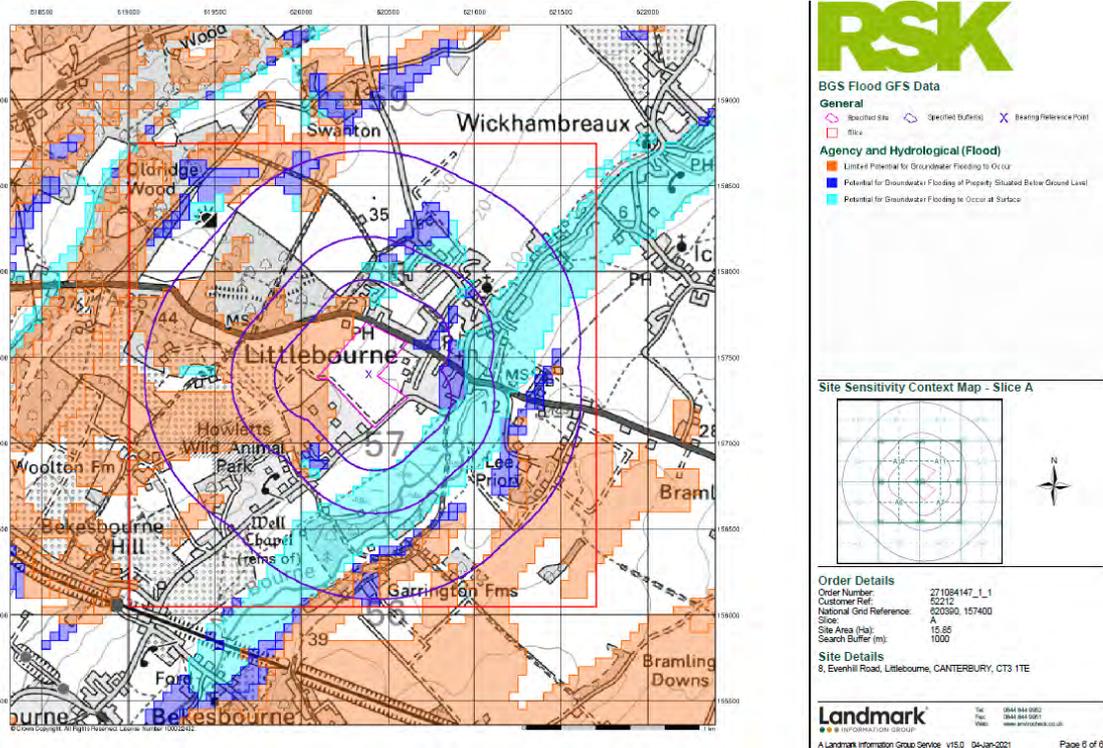


Figure 5.5: BGS groundwater flood risk mapping

Due to the sporadic nature of groundwater flooding, the levels at the site compared to the main river valley and the design of the development (i.e. no subterranean development), it is unlikely that groundwater flooding would affect the development. However further investigation should be undertaken to further inform the risk posed by groundwater emergence. The resultant groundwater flood risk is considered to be **very low**.

5.6.1 Climate change

Climate change could increase the risk of groundwater flooding as a result of increased precipitation filtering into the groundwater body. If winter rainfall becomes more frequent and heavier, groundwater levels may increase. Higher winter recharge may however be balanced by lower recharge during the predicted hotter and drier summers. This is less likely to cause a significant change to flood risk than from other sources, since groundwater flow is not as confined. It is probable that any locally perched aquifers may be more affected, but these are likely to be isolated. The change in flood risk is likely to be low.

5.7 Flooding from sewers

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its conveyance capacity, the system becomes blocked or it cannot discharge due to a high water level in the receiving watercourse. A sewer flood is often caused by surface water drains discharging into the combined sewer systems; sewer capacity is exceeded in large rainfall events causing the backing up of floodwaters within properties or discharging through manholes.

Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption⁸. One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30 year rainfall event. By definition a 1 in 100 year event would exceed the capacity of the surrounding sewer network as well as any proposed drainage.

When exceeded, the surcharged pipe work could lead to flooding from backed up manholes and gully connections. This could lead to immediate flooding within highways surrounding the site. A 150mm Dia foul water sewer is located along the road along the northern boundary of the site. This sewer flows in a south easterly direction taking foul water flows from the adjacent residential dwellings. Any exceedance of flows from this sewer will follow the road and not impact on the site. In addition, a rising main is located along the south west of the site taking flows from the pump station located to the north west of The Acres. A copy of the sewer plans is included as **Appendix C**.

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and a consequent potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure.

To ensure that sewer and surface water flooding is not exacerbated; surface water must be considered within the design of the site. This ensures that any additional surface water and overland flows are managed correctly, to minimise flood risk to the site and the surrounding area. The proposed surface water network on the site should be designed to ensure exceedance of the network has been considered.

5.7.1 Climate change

The impact of climate change is likely to be negative regarding flooding from sewers. Increased rainfall and more frequent flooding put existing sewer and drainage systems under additional pressure resulting in the potential for more frequent surcharging and potential flooding. This would increase the frequency of local sewer flooding but would not be significant in terms of the proposed development.

⁸ WRC, 'Sewers for Adoption' 8th Edition, 2018

5.8 Flooding from reservoirs

Flood events can occur from a sudden release of large volumes of water from reservoirs, canals and artificial structures.

The EA reservoir flood map (reproduced as **Figure 5.6**) shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a prediction of a worst-case scenario, it is unlikely that any actual flood would be this large. According to the EA Reservoir flood maps the site is not at risk of flooding from reservoirs.

Reservoir flooding is also extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to ensure reservoirs are maintained. The resultant flood risk is considered to be **very low**.

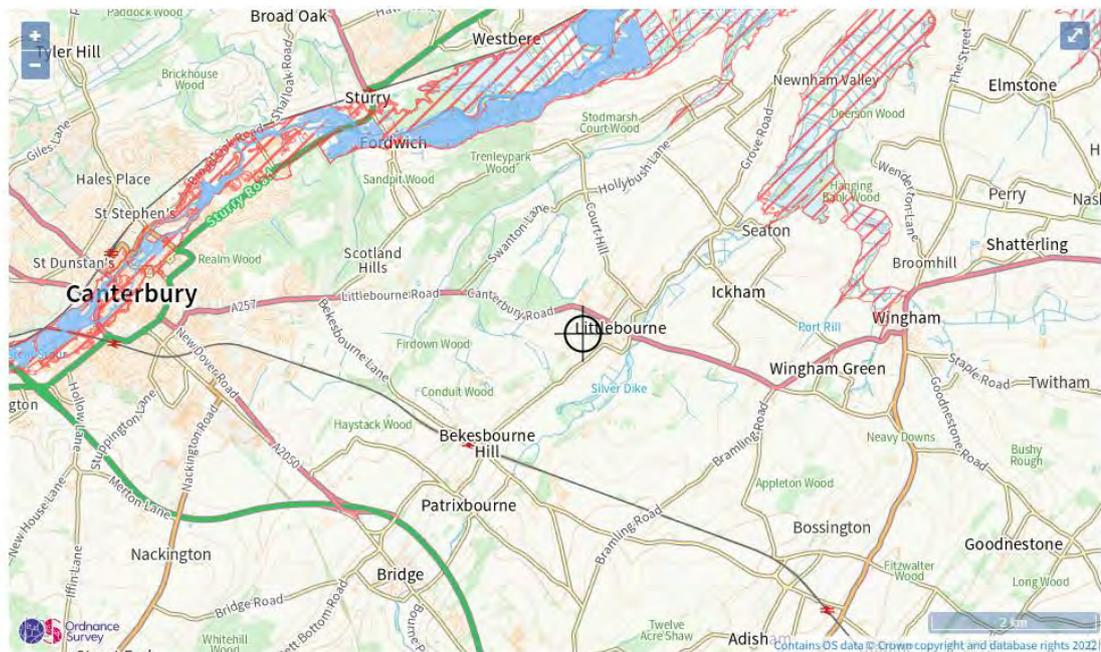


Figure 5.6: Environment Agency ‘Flood risk from reservoirs’ map (accessed December 2022)

Reservoirs can be managed over time, controlling inflow/outflow of water and therefore there is the capacity to control the effects of climate change. Increased rainfall has the potential to increase base flow, but this should be minimal. It is unlikely that there will be a substantial change to the risk of flooding for this site.

5.8.1 Canals

There are no Canal & Rivers Trust owned canals by the within the vicinity of the site. As a result, the risk to the site from this source is considered **very low**.

5.8.2 Blockages of artificial drainage systems

There is a possibility that flooding may result due to culverts and/or sewers being blocked by debris or structural failure. This can cause water to backup and result in localised flooding, as well as placing areas with lower ground levels at risk.

There are no known artificial drainage systems located on the site as such, the risk of flooding from artificial drainage systems is considered to be **very low**.

Climate change is unlikely to affect the flooding risk to the site from such blockages.

5.8.3 Historic Flooding

Historic flooding occurred in the winter of 2000/2001 where a combination of flooding from rivers, groundwater emergence, overland flow, runoff from farmland and highways as well as sewer surcharge caused flooding to villages along the Nailbourne and Littlebourne Valley. Whilst some properties of Littlebourne were impacted, the site is elevated and did not record any flooding. Development of the site should be seen as a potential opportunity to reduce the runoff from surface water and therefore have the potential to reduce the flood risk downstream.

6 FLOOD MITIGATION MEASURES

6.1 Overview

The developable area lies wholly within Flood Zone 1 and the risk of flooding from other sources is assessed as very low or low. To facilitate the development of the site a surface water drainage strategy has been designed, as discussed in Section 8.

6.2 Overland flow route

Existing surface water flow routes across the site will either be retained or incorporated into the proposed drainage system for the development.

All surface water runoff generated on site up to the 1 in 100 year climate change storm will be stored on site and discharged into an existing watercourse. Surface flows may be generated due to drainage capacity exceedance, which can be conveyed into the SuDS features via surface flows along the new roads.

6.3 Finished floor levels

As the developable area will not be affected by fluvial flooding there is no need to incorporate any freeboard levels into the finished floor levels of the design. Low lying areas that could lead to ponding of surface flows will be avoided by careful design of finished levels.

It is recommended that finished floors levels are set a minimum of 150mm above the local ground level in line with best practice to mitigate against the risk of surface water runoff.

6.4 Easements

Under the Water Resources Act 1991 and associated byelaws, works in, over, under or adjacent to main rivers require the consent of the EA and works in, over, under or adjacent to ordinary watercourses will require IDB, Local Authority or LLFA consent. This is to ensure that they neither interfere with the EA/LLFA's work nor adversely affect the environment, fisheries, wildlife and flood defence in the locality. A development free easement of 5m may be required along the surface water ditches through and adjacent to the site.

6.5 Safe access/egress

The developable area lies outside of the 1 in 1000 year fluvial flood extent, with the access road also located outside this flood extent, therefore safe access and egress will be available up to this storm event.

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7 PLANNING CONTEXT

7.1 Land use vulnerability

Table 2 of the PPG indicates the compatibility of various land uses in each flood zone, dependent on their vulnerability to flooding. Table 7.1 below is reproduced from Table 2 of PPG.

Table 7.1: Flood risk vulnerability and flood zone ‘compatibility’

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

With reference to Annex 3 of the NPPF, the proposed development, based on its residential use, is classed as 'more vulnerable'. This classification of development is appropriate for areas within Flood Zone 1 and therefore appropriate for the subject site.

7.2 Sequential Test

The Sequential Test aims to direct new development to areas with the lowest probability of flooding. The site has been identified as located within Flood Zone 1 with no other significant flooding issues from other sources. It is therefore considered to pass the Sequential Test.

7.3 Exception Test

In accordance with Table 7.1, there is no requirement to apply the Exception Test for a 'more vulnerable' development within Flood Zone 1.

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8 SURFACE WATER DRAINAGE ASSESSMENT

8.1 Scope

This section discusses the potential quantitative effects of the development on both the risk of surface water flooding on-site and elsewhere within the catchment, as well as the type of potential SuDS features that could be incorporated as part of the masterplan.

In accordance with the Defra Non-Statutory Technical Standards⁹, the surface water drainage strategy should seek to implement a SuDS hierarchy that aspires to achieve reductions in surface water runoff rates to greenfield rates. Where a reduction to the greenfield rate is not practicable, the proposed surface water drainage strategy should not exceed the existing runoff rate.

In addition, Building Regulations Part H¹⁰ requires that the first choice of surface water disposal should be to discharge to an adequate soakaway or infiltration system, where practicable. If this is not reasonably practicable then discharge should be to a watercourse, the least favourable option being to a sewer (surface water before combined). Infiltration techniques should therefore be applied wherever they are appropriate.

This assessment includes an overview and comparison of the existing greenfield scenario and proposed development scenario.

8.2 Pre-development situation

The existing site area is 15.77ha and 0% impermeable.

The pro-rata IoH 124¹¹ method has been used to estimate the Greenfield surface water runoff for the equivalent proposed developable area of the site (9.17ha), using the HR Wallingford Greenfield runoff rate estimation tool centred at the site. Calculations are contained in **Appendix D**.

⁹ DEFRA, 'Sustainable Drainage Systems - Non-statutory technical standards for sustainable drainage systems', March 2015.

¹⁰ HM Government (2010 with 2013 amendments), 'The Building Regulations 2010: Approved Document H - Drainage and Waste Disposal (2002 Edition incorporating 2010 amendments)'.

¹¹ Institute of Hydrology (IoH), 'Flood Estimation for small catchments - Report 124', 1994.

Table 8.1: IOH 124 surface water runoff (greenfield) for 9.17ha

Return period	Peak flow (l/s)
QBar	31.2
1 in 1 year	26.5
1 in 30 year	70.7
1 in 100 year	99.5

Based on the topography of the site, only 6.30Ha of the site currently drains towards a known outfall with the remaining 2.87Ha of the southern catchment falling towards the southeast corner where there is no known outfall. For this reason the greenfield runoff rates for the 6.30Ha has been determined using the pro-rata IOH 124 method, with the results presented in Table 8.2, below.

Table 8.2: IOH 124 surface water runoff (greenfield) for 6.3ha

Return period	Peak flow (l/s)
QBar	21.4
1 in 1 year	18.2
1 in 30 year	48.6
1 in 100 year	68.4

Calculations are contained in **Appendix D**.

8.3 Off-site discharge options and limits

The proposed development is for a residential end use. This will result in an increase in impermeable area and surface water runoff across the site. It will therefore be necessary to manage surface water on-site through conveyance towards the proposed point of discharge, whilst providing sufficient attenuation for all events up to the 1 in 100 year event inclusive of 45% climate change (based on latest climate change guidance).

8.3.1 Point of discharge

Infiltration should be considered as the primary option to discharge surface water from the developed site. The effectiveness of infiltration is completely dependent on the physical conditions at the site. Potential obstacles include:

- Local variations in permeability preventing infiltration – infiltration rates have been tested¹² and are evidenced to be not appropriate for infiltration based SuDS;
- Shallow groundwater table - For infiltration drainage devices, Building Regulation approved document H states that these “should not be built in ground where the water table reaches the bottom of the device at any time of the year”. Groundwater is not considered to be an issue, however this will need confirmation.
- Source Protection Zones - The site is partially located within a Groundwater Source Protection Zone III.

Based on the information available, infiltration based SuDS will be not suitable as a means of surface water discharge from the site.

The presence of the SPZ at the eastern extent of the site may mean that additional pollution mitigation of surface water runoff is required prior to final discharge.

Discharge to watercourse

Discharging surface water directly to a watercourse is considered feasible. The watercourse along the eastern boundary discharging under The Hill via the existing 225mm dia pipe currently receives surface water run off from the site. The onwards route of this system will require further investigation as will the condition of the culvert.

Discharge to surface water sewer

There are no surface water sewers within the site boundary or the surrounding area.

8.4 Post-development situation

The proposed development is approximately 29.1% impermeable (based on total site area), which, if unmitigated, will result in an increase in surface water runoff across the site. It will therefore be necessary to manage surface water on-site in order to limit the discharge of surface water off-site to an agreed rate, to provide sufficient on-site attenuation up to the 1 in 100 year climate change rainfall event and to provide improvements to water quality through appropriate source treatment. It is proposed to provide a surface water drainage strategy which will closely mimic the pre-development surface water drainage of the site.

8.4.1 Discharge Rate

It is proposed to discharge surface water from the site limited to greenfield run off rates to ensure flood risk off site is not increased. Due to some of the site not falling towards the proposed discharge point of the ditch along the eastern boundary of the site, only the contributing catchment has been considered. For this reason it is proposed to limit the offsite discharge from the drainage network totalling 21.4l/s (the QBar greenfield rate for the current contributing area) to be split between the two proposed basins.

¹² Land At Littlebourne, Canterbury: Infiltration Testing, RSK Report Ref - 52485-L01 (00) Jan 2023

8.4.2 Storage estimates

To determine the volume of attenuation storage that would be required on the site, the WinDes '4-Stage Design Guide' tool has been used. This allows for an attenuation figure to be calculated based upon basin dimensions, rainfall values and permitted discharge rates. These volumes can be later revised at detail design stage by the introduction of specific flow control methods.

The basins will provide surface water storage and attenuation for the 1 in 100 year storm plus 45% climate change event including an allowance of 10% for urban creep.

A climate change allowance of a 45% increase has been used based on the Environment Agency's Peak Rainfall Intensity Allowances published in May 2022. The guidance recommends to design for the upper end allowance in the 1% annual exceedance probability event for Development with a lifetime beyond 2100.

A set of results of the two basins is included as **Appendix E**.

8.4.3 Proposed drainage strategy

The proposed indicative outline drainage strategy is provided in **Appendix F** and outlines the following details regarding surface water drainage:

- Following the SuDS Hierarchy, infiltration based methods of surface water disposal are not considered feasible and therefore discharge to onsite watercourse has been considered;
- Offsite discharge to be limited to the greenfield QBAR rate for the contributing catchment area;
- Surface water will be attenuated in two basins located at the south-eastern and north-eastern boundary of the site;
- Due to the location of the outfall, the southern basin will be pumped towards the central ditch;
- The basins will provide surface water storage and attenuation for the 1 in 100 year storm plus 45% climate change event including an allowance of 10% for urban creep;
- The site will be drained via gravitational falls within surface water conveyance pipes towards areas of lower topography for attenuation. The basins are located towards the lowest area of the site, however an engineered fall towards the basin may be required on developable area to the immediate east of the basin. An alternative solution to ground raising could be the use of localised SuDs features at the source;
- There will be no infiltration within the Groundwater Source Protection Zone;
- Permeable paving could be incorporated within private roads, shared surfaces and driveways that are part of the development. These areas of paving can be used to collect and store runoff from the houses and surrounding hardstanding areas before joining the on-site surface water network that flows into the attenuation structure. Permeable paving reduces the volume of suspended sediment and hydrocarbon

pollution associated with residential developments, providing effective water quality improvements. Adopted roads will not be constructed using permeable paving due to ownership and future maintenance issues, where responsibility will most likely lie with the highway authority. As the surface area available for permeable paving is currently unknown then the storage volume of permeable paving has not been included in the calculations at this stage;

- Consent should be obtained from the LLFA or EA should any works be required near to the watercourses as part of the development.

The dimensions, volumes and location of the SuDS features will need to be revised as the masterplan develops and during the detailed planning stage. Detailed design of individual features is not part of the scope of this report. Preliminary design criteria have been based upon guidance given in the CIRIA publication 'The SUDS Manual'.

8.5 Water quality

The SUDS Manual contains guidance on how to assess water quality, stating *“Determining the hazard posed by the land use activities at a site and the extent to which underlying soil layers and/or proposed treatment components reduce the associated risk can be done using a variety of methods that vary in complexity and data requirements.”*

The assessment methodology required is determined by reference to Table 4.3 of the SuDS Manual. Based on this, the quality impacts of the proposed development can be summarised with the following pollution hazard levels and management requirements for discharge to the receiving surface water (there will be no infiltration on site, therefore receiving groundwater is not considered here):

- Other roofs (typically commercial/industrial roofs) – **Low** Pollution Hazard – Simple Index Approach.
- Commercial yard and delivery areas, non-residential car parking with frequent change (e.g., hospitals retail), all roads except low traffic roads and trunk roads/motorways – **Medium** Pollution Hazard – Simple Index Approach.
- Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites – **High** Pollution Hazard – Simple Index Approach.

It is therefore considered appropriate to use the Simple Index Approach (SIA) for the purpose of this assessment. The Simple Index Approach (SIA) to assessing water quality management requirements has been developed by CIRIA to support the implementation of the water quality management design methods set out in the SuDS Manual, with appropriate cross referencing to the relevant 'Design Conditions'. The CIRIA Susdrain website contains a spreadsheet based procedure that can be used for all the UK.

The notes for Table 8.3 indicate that extra measures may be required for discharges to protected resources and that for England and Wales, protected surface water resources are those designated for drinking water abstraction.

The SuDS Manual states that in England and Wales, where the discharge is to protected surface waters, an additional treatment component (i.e. over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance.

Simple Index Approach

Table 26.1 of the SUDS Manual indicates that for the Simple Index Approach:

- Simple pollution hazard indices should be based on land use (e.g. Table 26.2); and
- Risk reduction for Surface Water should be done using Simple SuDS hazard mitigation indices (e.g. Table 26.3).

Extracts of Tables 26.2 and 26.3 are replicated below, highlighting the relevant features applicable to this site:

Table 8.3: Extract of SuDS Manual Table 26.2: Pollution hazard indices for different land use classifications

Land use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, roofs, residential car parks, low traffic roads, non-residential car parking with infrequent change (schools, offices)	Low	0.5	0.4	0.4
All roads except low traffic roads	Medium	0.7	0.6	0.7

Table 8.4: Extract of Table 26.3: Indicative SuDS mitigation indices for discharges to surface waters

SuDS Feature	Mitigation Indices		
	TSS	Metals	Hydro-carbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Permeable pavement	0.7	0.6	0.7
Basin	0.5	0.5	0.6

The SuDS Manual States to deliver adequate treatment the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type):

Total SuDS mitigation index \geq pollution hazard index
(for each contaminant type) (for each contaminant type)

Where the mitigation of an individual component is insufficient, two components or more in series will be required where:

Total SuDS mitigation index = mitigation index₁ + 0.5 (mitigation index₂)

Where:

Mitigation index_n = mitigation index for component n

A factor of 0.5 is used to account for the reduction performance of secondary or tertiary components associated with already reduced inflow concentrations.

Where the infiltration component does not provide sufficient pollution mitigation, the design should include upstream SuDS components that are lined to prevent infiltration from occurring. The mitigation indices set out in CIRIA Table 26.3 should be used for upstream treatment.

A summary of the pollution scoring is included in Table 8.5, below. The table indicates that the SuDS components used for the indicative surface water drainage strategy provide adequate pollution mitigation, with the mitigation score exceeding the pollution hazard level. As the southern basin is located within Groundwater Source Protection Zone 2 then additional pollution mitigation may be required at detailed design, this could be provided as permeable paving or other features.

Table 8.5: Indicative surface water Simple Index Approach summary table

Characteristic	Indices,n	TSS	Metals	Hydro-carbons
Medium Risk	Hazard Level	0.7	0.6	0.7
Swale	Mitigation,1	0.5	0.6	0.6
Pond	Mitigation,2	0.7	0.7	0.5
	Total mitigation	0.85	0.95	0.85
Outcome		Mitigated	Mitigated	Mitigated

In summary, the use of a combination of SuDS as outlined above should demonstrate that in line with current guidelines, runoff is limited from the site following redevelopment. The incorporation of a treatment train using filter strips, filter drains, swales, permeable paving and infiltration basins will also demonstrate significant water quality benefits.

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9 CONCLUSIONS AND RECOMMENDATIONS

This FRA complies with the NPPF and Planning Practice Guidance and demonstrates that flood risk from all sources has been considered in the proposed development. It is also consistent with the Local Planning Authority requirements with regard to flood risk.

The proposed development site lies in an area designated by the EA as Flood Zone 1 and is outlined to have a chance of flooding of less than 1 in 1,000 (<0.1%) in any year.

The NPPF sets out a Sequential Test, which states that preference should be given to development located within Flood Zone 1 and at the lowest risk of flooding from all sources. This FRA demonstrates that the requirements of the Sequential Test have been met. The proposed development is classified as ‘more vulnerable’ and therefore considered appropriate within Flood Zone 1 without application of the Exception Test.

This FRA has considered multiple sources of flooding and concluded the following:

Table 9.1: Flood risk summary

Source	Level of risk	Mitigation
Fluvial	Very Low	The site is shown to be wholly within Flood Zone 1.
Tidal	Very Low	The site is inland and elevated.
Surface water	Very Low	There is limited surface water flood risk within the site boundary (limited to the onsite ditches).
Groundwater	Very Low	Groundwater levels are unlikely to pose risk to the development based the nature of proposed development.
Sewers	Very Low	The foul sewers (or rising main) are located outside of the site boundary and are unlikely to be a flood risk to the site.
Reservoir	Very Low	The site is not at risk from reservoir flooding.
Other sources	Very Low	There are no known artificial features.

The proposals will follow best practice regarding site drainage to ensure that any surface water runoff from the development is managed, ensuring flood risk is not increased elsewhere.

In order to prevent flooding on site attenuation and infiltration will be utilised to control surface water flows. These features will be designed to store the volume of water associated with a 1 in 100-year rainfall event, plus an additional allowance to account for increased rainfall due to climate change.

Overall, taking into account the above points, the development of the site should not be precluded on flood risk grounds.

APPENDIX A

RSK GROUP SERVICE CONSTRAINTS

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1. This report and the drainage design carried out in connection with the report (together the "Services") were compiled and carried out by RSK LDE Ltd (RSK) for Gladman Developments Ltd (the "client") in accordance with the terms of a contract between RSK and the "client" dated August 2022. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable civil engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.
7. The Services are based upon RSK's observations of existing physical conditions at the site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the appropriate location. Such features should not be used for setting out and should be considered indicative only.

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APPENDIX B TOPOGRAPHIC SURVEY

APPENDIX C SEWER RECORDS

Order received: 18 August 2020
Order completed: 19 August 2020

Drainage and water enquiry

Commercial

Order reference: LS/U1526070

Your reference: SF29055767000 LKS/Littlebourne
2020-34

Search address:

Land off Evenhill
Canterbury
Kent
CT3 1TA

Ordered by:

Searchflow
42 Kings Hill Avenue
West Malling
Kent
ME19 4AJ

For enquiries regarding the information provided in this report, please contact the LandSearch team:

Tel: 0845 270 0212
0330 303 0276 (individual consumers)

Email: searches@southernwater.co.uk

Web: www.southernwater.co.uk

LandSearch
Southern Water Services
Southern House
Capstone Road
Chatham
Kent
ME5 7QA

What you need to know about...

Private sewer transfer

On 1 October 2011, ownership of private sewers and lateral drains changed in accordance with The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The contents of this search may not reflect these changes.

For further information please visit our website: www.southernwater.co.uk/sewer-ownership-changes.

Records searched

The following records were searched in compiling this report: the Map of Public Sewers, the Map of Waterworks, water and sewerage records, the Register of Properties subject to Internal Foul Flooding, the Register of Properties subject to Poor Water Pressure and the Drinking Water Register. Should the property not fall entirely within Southern Water's region, a copy of the records held by the relevant water company was searched.

Competition in the non-household retail market

From April 2017 non-household customers in England can choose their retailer. 'Retail' refers to the way in which customers are billed for their water and sewerage as well as customer services including meter reading.

The 'wholesale' part of the water industry was not opened for competition in April 2017. This means Southern Water continues to look after the pipes and infrastructure for all its customers across Kent, Sussex, Hampshire and the Isle of Wight.

Moving

There can be a lot to do and remember when you're moving. Whether you are moving within our area, moving into our area or moving out of the area please let your retailer know.

Your order summary

Maps

1.1	Where relevant, please include a copy of an extract from the public sewer map.	Map provided
1.2	Where relevant, please include a copy of an extract from the map of waterworks.	Map provided

Drainage

2.1	Does foul water from the property drain to a public sewer?	No
2.2	Does surface water from the property drain to a public sewer?	No
2.3	Is a surface water drainage charge payable?	See answer
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	Yes
2.4.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?	No
2.5	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	No
2.5.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?	No
2.6	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
2.7	Has any sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	No
2.8	Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?	No
2.9	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	See answer

Water

3.1	Is the property connected to mains water supply?	No
3.2	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	No
3.3	Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
3.4	Is the property at risk of receiving low water pressure or flow?	No
3.5	What is the classification of the water supply for the property?	See answer
3.6	Is there a meter installed at this property?	See answer

Charging

4.1.1	Who is responsible for providing the sewerage services for the property?	Southern Water
4.1.2	Who is responsible for providing the water services for the property?	Southern Water
4.2	Who bills the property for sewerage services?	See answer
4.3	Who bills the property for water services?	See answer

Trade effluent information

4.4	Is there a consent on this property to discharge trade effluent under Section 118 of the Water Industry Act (1991) into the public sewerage system?	No
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Maps

Public sewer map

Q. 1.1: Where relevant, please include a copy of an extract from the public sewer map.

A.: A copy of an extract from the public sewer map is provided.

Guidance Notes:

The Water Industry Act 1991 defines public sewers as those which the Company has responsibility for. Other assets and rivers, watercourses, ponds, culverts or highway drains may be shown for information purpose only.

Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an "as constructed" record. It is recommended these details be checked with the developer.

Map of waterworks

Q. 1.2: Where relevant, please include a copy of an extract from the map of waterworks.

A.: A copy of an extract of the map of waterworks is provided.

Guidance Notes:

Assets other than vested water mains may be shown on the plan for information only.

The Company is not responsible for private supply pipes connecting the property to the public water main and does not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Drainage

Foul water

Q. 2.1: Does foul water from the property drain to a public sewer?

A.: The Company's records indicate that foul water from the property does not drain to the public sewerage system.

Guidance Notes:

The Company is not responsible for private drains and sewers that connect the property to the public sewerage system and does not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

The copy extract will show known public sewers in the vicinity of the property. It should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

If foul water does not drain to the public sewerage system the property may have private facilities in the form of a cesspit, septic tank or other type of treatment plant.

Surface water

Q. 2.2: Does surface water from the property drain to a public sewer?

A.: The Company's records indicate that surface water from the property does not drain to the public sewerage system. If the property was constructed after 6 April 2015 the surface water drainage may be served by a Sustainable Drainage System. Further information may be available from the developer.

Guidance Notes:

The Company is not responsible for private drains and sewers that connect the property to the public sewerage system and does not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

The copy extract will show known public sewers in the vicinity of the property. It should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

In some cases company records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Company.

If surface water does not drain to the public sewerage system the property may have private facilities in the form of a soakaway or private connection to a watercourse.

Surface water drainage charge

Q. 2.3: Is a surface water drainage charge payable?

A.: Records confirm that a surface water drainage charge is not applicable at this property. If the property was constructed after 6 April 2015 the surface water drainage may be served by a Sustainable Drainage System. Further information may be available from the developer.

Guidance Notes:

Where surface water from a property does not drain to the public sewerage system no surface water drainage charges are applicable.

If on inspection the buyer finds that the property is not connected for surface water drainage, the buyer should contact their retailer.

Public sewers within the boundary of the property

Q. 2.4: Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?

A.: The public sewer map included indicates that there is a public sewer, disposal main or lateral drain within the boundaries of the property. However, from 1 October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map but which may further prevent or restrict development of the property.

Guidance Notes:

The approximate boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.

The presence of a public sewer within the boundary of the property may restrict further development within it.

Southern Water Services has a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of Southern Water Services or its contractors needing to enter the property to carry out work.

Please note if the property was constructed after 1 July 2011 any sewers and/or lateral drain within the boundary of the property are the responsibility of the householder.

Public pumping station within the boundary of the property

Q. 2.4.1: Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?

A.: The public sewer map included indicates that there is no public pumping station within the boundaries of the property. Any other ancillary apparatus is shown on the public sewer map and referenced on the legend.

Guidance Notes:

The approximate boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.

The presence of a pumping station within the boundary of the property may restrict further development within it.

Southern Water Services has a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of Southern Water Services or its contractors needing to enter the property to carry out work.

It should be noted that only private pumping stations installed before 1 July 2011 will be transferred into the ownership of Southern Water Services.

Public sewers near to the property

Q. 2.5: Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

A.: The public sewer map indicates that there are no public sewers within 30.48 metres (100 feet) of a building within the property.

Guidance Notes:

From 1 October 2011 there may be additional lateral drains and/or public sewers which are not recorded on the public sewer map but are also within 30.48 metres (100 feet) of a building within the property.

The presence of a public sewer within 30.48 metres (100 feet) of a building within the property can result in the local authority requiring a property to be connected to the public sewer.

The measure is estimated from the Ordnance Survey record, between a building within the boundary of the property and the nearest public sewer.

Public pumping station near to the property

Q. 2.5.1: Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?

A.: The public sewer map included indicates that there is no public pumping station within 50 metres of any buildings within the property. Any other ancillary apparatus is shown on the public sewer map and referenced on the legend.

Guidance Notes:

The measure is estimated from the Ordnance Survey record, between a building within the boundary of the property and the nearest pumping station.

It should be noted that only private pumping stations installed before 1 July 2011 will be transferred into the ownership of Southern Water Services.

Public adoption of sewers and lateral drains

Q. 2.6: Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?

A.: Records indicate that the sewers serving the development, of which this property forms part, are not the subject of an application for adoption under Section 104 of the Water Industry Act 1991. Where the property is part of an established development it would not normally be subject to an adoption agreement under Section 104 of the Water Industry Act 1991.

Guidance Notes:

This enquiry is of interest to purchasers of new homes who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Any sewers and/or lateral drains within the boundary of the property are not the subject of an adoption agreement and remain the responsibility of the householder. Adoptable sewers are normally those situated in the public highway.

Building over a public sewer, disposal main or drain

Q. 2.7: Has the sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?

A.: There are no records in relation to any approval or consultation about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.

Guidance Notes:

Buildings or extensions erected over a sewer in contravention of Building Control may have to be removed or altered.

From 1 October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership and the sewerage undertaker may not have approved or been consulted about any plans to erect a building or extension on the property or in the vicinity of these.

Risk of flooding due to overloading public sewers

Q. 2.8: Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?

A.: The building is not recorded as being at risk of internal flooding due to overloaded public sewers. From 1 October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership. It is therefore possible that a building may be at risk of internal flooding due to an overloaded public sewer which the sewerage undertaker is not aware of. For further information it is recommended that enquiries are made of the vendor.

Guidance Notes:

A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.

"Internal flooding" from the public sewers is defined as flooding, which enters a building or passes below a suspended floor.

For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.

"At Risk" properties are defined as properties that have suffered or are likely to suffer internal flooding from the public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the sewerage undertaker's reporting procedure.

Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included.

Buildings may be at risk of flooding but not identified where flooding incidents have not been reported to the sewerage undertaker.

Public sewers are defined as those for which the sewerage undertaker holds statutory responsibility under the Water Industry Act 1991.

It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the sewerage undertaker. This report excludes flooding from the private sewers and drains and the sewerage undertaker makes no comment upon this matter.

Sewage treatment works

Q. 2.9: Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.

A.: The nearest sewage treatment works is 3.65 kilometres North of the property. The name of the sewage treatment works is WESTBERE WTW, which is the responsibility of Southern Water Services, Southern House, Yeoman Road, Worthing, West Sussex, BN13 3NX.

Guidance Notes:

The nearest sewage treatment works will not always be the sewage treatment works serving the catchment within which the property is situated.

The sewerage undertaker's records were inspected to determine the nearest sewage treatment works.

It should be noted that there may be a private sewage treatment works closer than the one detailed above that have not been identified.

Water

Connection to mains water supply

Q. 3.1: Is the property connected to mains watersupply?

A.: Records indicate that the property is not connected to mains water supply and water is therefore likely to be provided by virtue of a private supply.

Guidance Notes:

The situation should be checked with the current owner of the property.

Details of private supplies are not kept by the water undertaker.

Water mains, resource mains or discharge pipes

Q. 3.2: Are there any water mains, resource mains or discharge pipes within the boundaries of the property?

A.: The map of waterworks does not indicate any water mains, resource mains or discharge pipes within the boundaries of the property.

Guidance Notes:

The boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.

The presence of a public water main within the boundary of the property may restrict further development within it.

Water undertakers have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the water undertaker or its contractors needing to enter the property to carry out work.

Adoption of water mains and services pipes

Q. 3.3: Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?

A.: Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.

Guidance Notes:

This enquiry is of interest to purchasers of new homes who will want to know whether or not the property will be linked to the mains water supply.

Risk of low water pressure or flow

Q. 3.4: Is the property at risk of receiving low water pressure or flow?

A.: Records confirm that the property is not recorded by the water undertaker as being at risk of receiving low water pressure or flow.

Guidance Notes:

"Low water pressure" means water pressure below the regulatory reference level which is the minimum pressure when demand on the system is not abnormal.

The reference level of service is a flow of 9 litres/minute at a pressure of 10 metres head on the customer's side of the main stop tap (mst). The reference level of service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap.

The reference level applies to a single property. Where more than one property is served by a common service pipe, the flow assumed in the reference level must be appropriately increased to take account of the total number of properties served.

For two properties, a flow of 18 litres/minute at a pressure of 10 metres head on the customer's side of the mst is appropriate. For three or more properties the appropriate flow should be calculated from the standard loadings provided in BS6700 or Institute of Plumbing handbook.

Water companies include properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level). Refer to list below:

Abnormal demand: This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand which are normally expected. Companies exclude properties which are affected by low pressure only on those days with the highest peak demands. During the year companies may exclude, for each property, up to five days of low pressure caused by peak demand.

Planned maintenance: Companies exclude low pressures caused by planned maintenance. It is not intended that companies identify the number of properties affected in each instance. However, companies must maintain sufficiently accurate records to verify that low pressure incidents that are excluded because of planned maintenance are actually caused by maintenance.

One-off incidents: This exclusion covers a number of causes of low pressure; mains bursts; failures of company equipment (such as PRVs or booster pumps); firefighting; and action by a third party. However, if problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded.

Low pressure incidents of short duration: Properties affected by low pressures which only occur for a short period, and for which there is evidence that incidents of a longer duration would not occur during the course of the year, may be excluded.

Water hardness

Q. 3.5: What is the classification of the water supply for the property?

A.: The water supplied to the property has an average water hardness of 301 mg/l calcium carbonate which is defined as "Very hard" by Southern Water.

Guidance Notes:

The hardness of water depends on the amount of calcium in it – the more it contains, the harder the water is.

There is no UK or European standard set for the hardness of drinking water. More information on water hardness can be found on the Drinking Water Inspectorates' website: <http://www.dwi.gov.uk/>

Water hardness can be expressed in various indices for example the hardness settings for dishwashers are commonly expressed in Clark's degrees, but check with the manufacturer as there are also other units. The following table explains how to convert mg/l calcium and mg/l calcium carbonate classifications.

To Convert from:	To Clark degrees	To French degrees	To German degrees
mg/l calcium	multiply by 0.18	multiply by 0.25	multiply by 0.14
mg/l calcium carbonate	multiply by 0.07	multiply by 0.10	multiply by 0.056

Water meters

Q. 3.6: Is there a meter installed at this property?

A.: Records indicate that the property is not served by a water meter.

Guidance Notes:

Where the property is not served by a water meter and the customer wishes to consider this method of charging they should contact their water retailer.

If a property is measured (metered) upon change of occupation this property will retain the meter.

Charging

Sewerage undertaker

Q. 4.1.1: Who is responsible for providing the sewerage services for the property?

A.: Southern Water is responsible for providing the sewerage services for the property.

Guidance Notes:

The 'wholesale' part of the water industry did not open for competition in April 2017. This means that Southern Water continues to operate the network of pipes, mains and treatment works.

As a wholesaler, Southern Water sells sewerage services to the companies who enter the retail market. In some instances, wholesalers will still need to interact directly with customers. For example, customers will still contact Southern Water to report internal sewer flooding.

Water undertakers

Q. 4.1.2: Who is responsible for providing the water services for the property?

A.: Southern Water is responsible for providing the water services for the property.

Guidance Notes:

The 'wholesale' part of the water industry did not open for competition in April 2017. This means that water undertakers continue to operate the network of pipes, mains and treatment works.

As a wholesaler, water undertakers sell water services to the companies who enter the retail market. In some instances, wholesalers will still need to interact directly with customers. For example, customers will still contact water undertakers to report leaks.

Sewerage bills

Q. 4.2: Who bills the property for sewerage services?

A.: If you wish to know who bills the sewerage services for this property then you will need to contact the current owner. For a list of all potential retailers of sewerage services for the property please visit www.open-water.org.uk.

Guidance Notes:

From April 2017 non-household customers in England can choose their retailer.

'Retail' refers to the way in which customers are billed for their water and sewerage as well as customer services including meter reading.

Water bills

Q. 4.3: Who bills the property for water services?

A.: If you wish to know who bills the water services for this property then you will need to contact the current owner. For a list of all potential retailers of water services for the property please visit www.open-water.org.uk.

Guidance Notes:

From April 2017 non-household customers in England can choose their retailer.

'Retail' refers to the way in which customers are billed for their water and sewerage as well as customer services including meter reading.

Trade effluent information

Q. 4.4: Is there a consent on this property to discharge trade effluent under Section 118 of the Water Industry Act (1991) into the public seweragesystem?

A.: The trader operating at this commercial property does not hold either a Trade Effluent Consent, or an acknowledgement of a trade effluent discharge, as issued by Southern Water.

Guidance Notes:

Please note, any existing consent is dependent on the business being carried out at the property and will not transfer automatically upon change of ownership.

Any change of ownership from the current incumbent of a property will require the negotiation of a new trade effluent consent or a new acknowledgement between the new incumbent and Southern Water.

Where consent or acknowledgement details have been provided, this does not represent a direct copy of the original.

Other Information

Additional meter information

No further information.

DISCLAIMER: These replies and information, including that shown on the enclosed plan(s), are given on the distinct understanding that neither the Company nor any of its representatives is legally liable for its accuracy or for any action or omission to act whatsoever by anyone on the strength of that information, save as to obvious error. In particular, any person proposing to construct or excavate on land on the basis of information hereby provided should carry out all necessary on-site investigations.

Appendix one: Terms and expressions

- "the 1991 Act" means the Water Industry Act 1991(i);
- "the 2000 Regulations" means the Water Supply (Water Quality) Regulations 2000(ii);
- "the 2001 Regulations" means the Water Supply (Water Quality) Regulations 2001(iii);
- "adoption agreement" means an agreement made or to be made under Section 51A(1) or 104(1) of the 1991 Act(iv);
- "bond" means a surety granted by a developer who is a party to an adoption agreement;
- "bond waiver" means an agreement with a developer for the provision of a form of financial security as a substitute for a bond;
- "calendar year" means the twelve months ending with 31 December;
- "discharge pipe" means a pipe from which discharges are made or are to be made under Section 165(1) of the 1991 Act;
- "disposal main" means (subject to Section 219(2) of the 1991 Act) any outfall pipe or other pipe which:
- (a) is a pipe for the conveyance of effluent to or from any sewage disposal works, whether of a sewerage undertaker or of any other person; and
 - (b) is not a public sewer;
- "drain" means (subject to Section 219(2) of the 1991 Act) a drain used for the drainage of one building or any buildings or yards appurtenant to buildings within the same curtilage;
- "effluent" means any liquid, including particles of matter and other substances in suspension in the liquid;
- "financial year" means the twelve months ending with 31 March;
- "lateral drain" means:
- (a) that part of a drain which runs from the curtilage of a building (or buildings or yards within the same curtilage) to the sewer with which the drain communicates or is to communicate; or
 - (b) (if different and the context so requires) the part of a drain identified in a declaration of vesting made under Section 102 of the 1991 Act or in an agreement made under Section 104 of that Act(v);
- "licensed water supplier" means a company which is the holder for the time being of a water supply licence under Section 17A(1) of the 1991 Act(vi);
- "maintenance period" means the period so specified in an adoption agreement as a period of time:
- (a) from the date of issue of a certificate by a sewerage undertaker to the effect that a developer has built (or substantially built) a private sewer or lateral drain to that undertaker's satisfaction; and
 - (b) until the date that private sewer or lateral drain is vested in the sewerage undertaker;
- "map of waterworks" means the map made available under section 198(3) of the 1991 Act(vii) in relation to the information specified in subsection (1A);
- "private sewer" means a pipe or pipes which drain foul or surface water, or both, from premises, and are not vested in a sewerage undertaker;
- "public sewer" means, subject to Section 106(1A) of the 1991 Act(viii), a sewer for the time being vested in a sewerage undertaker in its capacity as such, whether vested in that undertaker:
- (a) by virtue of a scheme under Schedule 2 to the Water Act 1989(ix);
 - (b) by virtue of a scheme under Schedule 2 to the 1991 Act(x);
 - (c) under Section 179 of the 1991 Act(xi); or
 - (d) otherwise;
- "public sewer map" means the map made available under Section 199(5) of the 1991 Act(xii);
- "resource main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a trunk main, which is or is to be used for the purpose of:
- (a) conveying water from one source of supply to another, from a source of supply to a regulating reservoir or from a regulating reservoir to a source of supply; or
 - (b) giving or taking a supply of water in bulk;
- "sewerage services" includes the collection and disposal of foul and surface water and any other services which are required to be provided by a sewerage undertaker for the purpose of carrying out its functions;
- "sewerage undertaker" means the company appointed to be the sewerage undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated;
- "surface water" includes water from roofs and other impermeable surfaces within the curtilage of the property;
- "water main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a pipe for the time being vested in a person other than the water undertaker, which is used or to be used by a water undertaker or licensed water supplier for the purpose of making a general supply of water available to customers or potential customers of the undertaker or supplier, as distinct from for the purpose of providing a supply to particular customers;
- "water meter" means any apparatus for measuring or showing the volume of water supplied to, or of effluent discharged from any premises;
- "water supplier" means the company supplying water in the water supply zone, whether a water undertaker or licensed water supplier;
- "water supply zone" means the names and areas designated by a water undertaker within its area of supply that are to be its water supply zones for that year; and
- "water undertaker" means the company appointed to be the water undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated.

In this report, references to a pipe, including references to a main, a drain or a sewer, shall include references to a tunnel or conduit which serves or is to serve as the pipe in question and to any accessories for the pipe.

- (i) 1991 c.56.
- (ii) S.I. 2000/3184. These Regulations apply in relation to England.
- (iii) S.I. 2001/3911. These Regulations apply in relation to Wales.
- (iv) Section 51A was inserted by Section 92(2) of the Water Act 2003 (c. 37). Section 104(1) was amended by Section 96(4) of that Act.
- (v) Various amendments have been made to Sections 102 and 104 by section 96 of the Water Act 2003.
- (vi) Inserted by Section 56 of and Schedule 4 to the Water Act 2003.
- (vii) Subsection (1A) was inserted by Section 92(5) of the Water Act 2003.
- (viii) Section 106(1A) was inserted by Section 99 of the Water Act 2003.
- (ix) 1989 c. 15.
- (x) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
- (xi) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
- (xii) Section 199 was amended by Section 97(1) and (8) of the Water Act 2003.

Appendix two: A guide to new development

The information contained below is for general guidance only. It is recommended that Southern Water's Developer Services department be contacted for further details concerning new infrastructure development.

Wastewater information

Sewer requisitions

It may be necessary for a developer to request that Southern Water provides a public sewer to connect a development site to the existing public system. The developer is responsible for the cost of the work, although a discount will be applied based on the future predicted income from the development served by the new sewer.

Sewer diversions

If a public sewer crosses private land, it may be possible for the landowner/developer to request the sewer be diverted. In the majority of cases Southern Water will allow the developer to undertake this work under close supervision. Whether Southern Water or the developer undertakes the diversionary works the costs are the responsibility of the developer.

Building-over sewers

Public sewers are afforded statutory protection and consequently there is no right to build over or in close proximity to a public sewer. If an existing public sewer either crosses a development site or is located in close proximity to a development site it is essential that a developer contact Southern Water.

Sewer connections

A developer can serve notice on Southern Water that it wishes to make a connection to the public sewerage system. The developer must provide 21 days' notice and the work will be supervised by Southern Water.

Water information

Water requisitions

It may be necessary for a developer to request that Southern Water provides both:

- (a) a public water main to connect a development site to the existing public system and,
- (b) on-site public water mains to serve the individual properties.

In both cases the developer is responsible for the cost of the work, although a discount will be applied based on the future predicted income from the development.

It is possible for the developer to lay the on-site mains themselves under a Self-Lay Agreement. Further details are available from Southern Water.

Water main diversions

The building over or in close proximity to public water mains is not permitted. A developer must request that Southern Water undertakes a diversion of a water main that is affected by a development.

Water connections

A developer can request a new connection to a public water main. This work will be undertaken by Southern Water.

Contact us

For specific information on Southern Water's Developer Services service, including details on how to contact the right person, please visit our website: www.southernwater.co.uk/developers-and-builders-overview.

Appendix three: Terms and conditions

The Customer the Client and the Purchaser are asked to note these terms, which govern the basis on which this drainage and water report is supplied.

Definitions

"The Company" means the water service company operating within the Southern Water drainage area that provides information to Southern Water for this commercial search Report.

"Order" means any request completed by the Customer requesting the Report.

"Report" means the drainage and/or water report prepared by The Company in respect of the Property.

"Property" means the address or location supplied by the Customer in the Order.

"Customer" means the person, company, firm or other legal body placing the Order, either on their own behalf as Client, or, as an agent for a Client.

"Client" means the person, company or body who is the intended recipient of the Report with an actual or potential interest in the Property.

"Purchaser" means the actual or potential purchaser of the Property including their mortgage lender.

1.0 Agreement

1.1 Southern Water agrees to supply the Report subject to these terms. The scope and limitations of the Report are described in paragraph 2 of these terms. Where the Customer is acting as an agent for the Client then the Customer shall be responsible for bringing these terms to the attention of the Client.

1.2 The Customer and Client agree that the placing of an Order for a Report indicates their acceptance of these terms.

2.0 The Report

Whilst Southern Water will use reasonable care and skill in producing the Report, it is provided to the Client on the basis that they acknowledge and agree to the following:

2.1 The information contained in the Report can change on a regular basis so Southern Water cannot be responsible to the Client for any change in the information contained in the Report after the date on which the Report was produced and sent to the Client.

2.2 The Report does not give details about the actual state or condition of the Property nor should it be used or taken to indicate or exclude actual suitability or unsuitability of the Property for any particular purpose, or relied upon for determining saleability or value, or used as a substitute for any physical investigation or inspection. Further advice and information from appropriate experts and professionals should always be obtained.

2.3 The information contained in the Report is based upon the accuracy of the address supplied by the Customer or Client.

2.4 The Report provides information as to the location and connection of existing services, and details of trade effluent consents. It should not be relied upon for any other purpose. The Report may contain opinions or general advice to the Customer and the Client and Southern Water cannot ensure that any such opinion or general advice is accurate, complete or valid and accepts no liability therefore.

2.5 The position and depth of apparatus shown on any maps attached to the Report are approximate, and are furnished as a general guide only, and no warranty as to its correctness is given or implied. The exact positions and depths should be obtained by excavation trial holes.

3.0 Liability

3.1 Southern Water shall not be liable to the Client for any failure defect or non-performance of its obligations arising from any failure of or defect in any machine, processing system or transmission link or anything beyond Southern Water's reasonable control or the acts or omissions or any party for whom Southern Water is not responsible.

3.2 Where a Report is requested for an address falling within a geographical area where Southern Water and another Company separately provide water and sewerage services, then it shall be deemed that liability for the information given by Southern Water or the Company as the case may be will remain with Southern Water or the Company as the case may be in respect of the accuracy of the information supplied. Where Southern Water is supplying information which has been provided to it by another Company for the purposes outlined in this agreement, Southern Water will therefore not be liable in any way for the accuracy of that information.

3.3 Where the Customer sells this Report to a Client (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) Southern Water or the Company as the case may be shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) be liable for any loss or damage whatsoever (save to the extent provided by clause 3.4) and the Customer shall indemnify Southern Water in respect of any claim (other than a claim covered by clause 3.4) by the Client.

3.4 Southern Water shall accept liability for death or personal injury arising from its negligence.

3.5 The entire liability of Southern Water or the Company as the case may be in respect of all causes of action arising under or in connection with the Report (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) shall not exceed £2,000,000 (two million pounds); and Southern Water or the Company as the case may be shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) be liable for any loss of profit, loss of goodwill, loss of reputation, loss of business or any indirect, special or consequential loss, damage or other claims, costs or expenses.

4.0 Copyright and confidentiality

4.1 The Customer and the Client acknowledge that the Report is confidential and is intended for the personal use of the Client. The copyright and any other intellectual property rights in the Report shall remain the property of Southern Water. No intellectual or other property rights are transferred or licensed to the Customer or the Client except to the extent expressly provided.

4.2 The Customer or Client is entitled to make copies of the Report (other than any maps contained in the, or attached to the Report, where no copying is permitted).

4.3 The Customer and Client agree (in respect of both the original and any copies made) to respect and not to alter any trademark, copyright notice or other property marking which appears on the Report.

4.4 The maps contained in the Report are protected by Crown Copyright and must not be used for any purpose outside the context of the Report.

4.5 The Customer and the Client agree to indemnify Southern Water or the Company as the case may be against any losses, costs, claims and damage suffered by Southern Water or the Company as the case may be, as a result of any breach by either of them of the terms of paragraphs 4.1 to 4.4 inclusive.

5.0 Payment

5.1 Unless otherwise stated all prices are inclusive of VAT. The Customer shall pay for the price of the Report specified by Southern Water, without any set off, deduction or counterclaim. Unless the Customer or Client has an account with Southern Water for payment for Reports, payments for Reports must be received in full by Southern Water before the Report is produced. For Customers or Clients with accounts, payment terms will be as agreed with Southern Water.

6.0 General

6.1 If any provision of these terms is or becomes invalid or unenforceable, it will be taken to be removed from the rest of these terms to the extent that it is invalid or unenforceable. No other provision of these terms shall be affected.

6.2 These terms shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts.

6.3 Nothing in this notice shall in any way restrict your statutory or any other rights of access to the information contained in the Report.

These Terms and conditions are available in larger print for those with impaired vision.

Appendix four: Complaints procedure

When we get it wrong

You deserve the highest standard of service from us, but sometimes we make mistakes. If we do, please let us know and we will investigate and review your concerns.

Whilst we always try to resolve all complaints straight away, if this is not possible and you are not happy with the course of action taken by us, you can ask us to escalate the issue internally or take your complaint to an independent third party.

How you contact us

Firstly please call us and we will try to sort out your problem straight away.

You can call us between 8am and 5pm, Monday to Friday on 0845 270 0212 or 0330 303 0276 (individual consumers);

Email us at searches@southernwater.co.uk; or

Write to us at LandSearch, Southern Water Services, Southern House, Capstone Road, Chatham, Kent, ME5 7QA.

What you can expect

You will receive a full, fair and courteous response from someone who can effectively deal with your problem.

If we can remedy the problem straight away we will do it but if we cannot immediately resolve your problem we will keep you informed of actions being taken.

The process

We will try to resolve any telephone contact or complaint at the time of the call, however, if that isn't possible, we will take the details of your complaint and we will investigate and get back to you within 10 working days.

We will respond to written complaints within 10 working days of the date received, but we will always aim to respond more quickly. Depending on the scale of investigation required, we will keep you informed of the progress and update you with new timescales if necessary.

If you are still not satisfied with our response or action we will refer the matter to a Senior Manager for resolution. At your request we will liaise with a third party representative acting on your behalf.

Our commitment to you

If we do not respond to your complaint within 10 working days of receipt of your contact, we will compensate you in line with Southern Water's Customer services — Guaranteed standards of service for business customers.

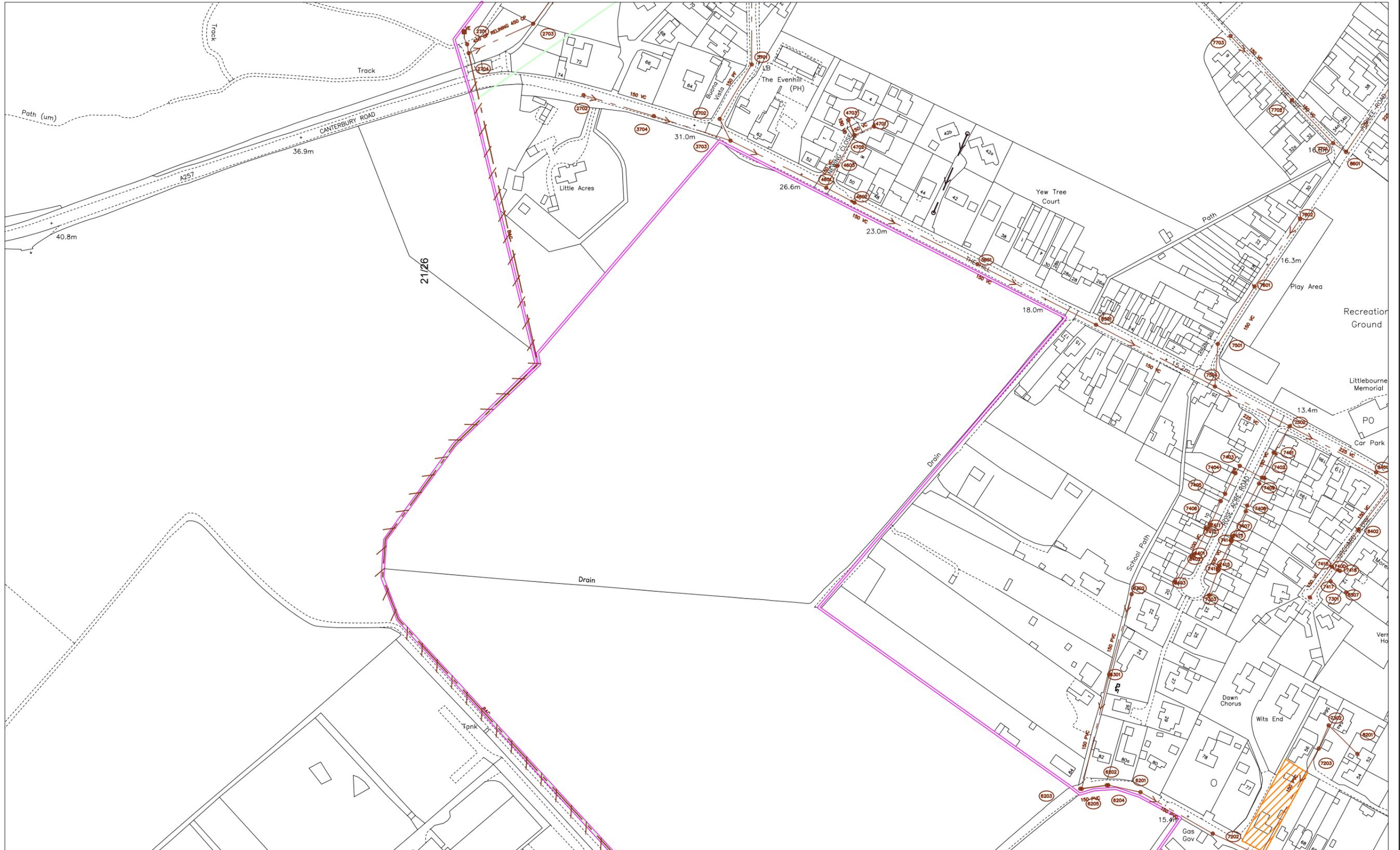
If we find your complaint to be justified, or we have made any errors that substantially change the outcome in your search result, we will refund the search fee. We will also provide you with a revised search and undertake the necessary action to put things right as soon as practically possible. You will be kept informed of the progress of any action required.

If you remain dissatisfied

While we aim to resolve your complaint first time, in the event that we are unable to resolve the issue to your satisfaction, ultimately you can contact a third party. Please make sure that you have followed the process above first, if not, your complaint will be passed back to us.

SEWER RECORDS PAGE 1 OF 2

157798



157221

O.S. REF. TR2057NW	Drawn by: rohandas	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement		
	Scale: 1:2500			
Title: Land off Evenhill	Date: 19/08/2020	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.		

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SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
2701X	36.89		UNK	UNK	UNK																		
2702X	33.44		150	VC	CIRC																		
2703X	34.37	32.58	450	CP	CIRC																		
2704X	35	33.45	450	CP	CIRC																		
3701X	31.02	28.84	150	PF	CIRC																		
3702X	30.12	28.41	150	PF	CIRC																		
3703X	29.5		150	VC	CIRC																		
3704X	32.22		150	VC	CIRC																		
4601X	10.914	23.86	150	VC	CIRC																		
4602X	24.55	22.06	150	VC	CIRC																		
4603X	25.71	24.09	150	VC	CIRC																		
4701X	11.8	24.46	150	VC	CIRC																		
4702Y	9.431	24.38	150	VC	CIRC	*																	
4702X	9.431	24.28	150	VC	CIRC	*																	
4703X	11.753		150	VC	CIRC																		
5601X	20.3	17.32	150	VC	CIRC																		
5701X			UNK	UNK	CIRC																		
6201X	15.92	13.94	150	PVC	CIRC																		
6203X	17.2	15.25	150	PVC	CIRC																		
6204X	16.57	14.49	150	PVC	CIRC																		
6205X	17.21	14.86	150	PVC	CIRC																		
6301X	17.87	16.23	150	PVC	CIRC																		
6302X	17.98	16.63	150	PVC	CIRC																		
6401X	16.1	15.25	100	VC	CIRC																		
6402X	16.22	15.4	100	VC	CIRC																		
6403X	16.49	15.87	100	VC	CIRC																		
6501X	16.63	13.49	150	VC	CIRC																		
7202X	14.69	12.64	150	PVC	CIRC																		
7203X	14.28	12.05	150	PVC	CIRC																		
7301X	13.42	11.86	150	VC	CIRC																		
7302X	14.48	12.38	150	PVC	CIRC																		
7303X	15.79	14.97	100	VC	CIRC																		
7401X	13.98	12.57	150	VC	CIRC																		
7402X	14.05	12.92	150	VC	CIRC																		
7403X	14.87	13.42	150	VC	CIRC																		
7404X	14.81	13.47	150	VC	CIRC																		
7405X	15.13	13.92	150	VC	CIRC																		
7406X	15.14	14.06	150	VC	CIRC																		
7407X	14.71	13.4	150	VC	CIRC																		
7408X	14.53	13.28	150	VC	CIRC																		
7409X	14.32	13	150	VC	CIRC																		
740DX			UNK	UNK	CIRC																		
7410X	13.14	11.44	150	VC	CIRC																		
7411X	15.67	14.62	100	VC	CIRC																		
7412X	15.78	14.72	100	VC	CIRC																		
7413X	15.02	13.85	100	VC	CIRC																		
7414X	15.15	13.95	100	VC	CIRC																		
7415X	15.44	14.4	100	VC	CIRC																		
7416X	15.6	14.51	100	VC	CIRC																		
7417X			UNK	UNK	CIRC																		
7418X			UNK	UNK	CIRC																		
7501X	15.67	12.77	150	VC	CIRC																		
7502X	13.36	11.29	225	VC	CIRC																		
7504X	14.43	11.93	225	VC	CIRC																		
7601X	16.4	14.23	150	VC	CIRC																		
7602X	16.53	15.13	150	VC	CIRC																		
7701X	16.73	15.28	150	VC	CIRC																		
7702X	17.5	16.05	150	VC	CIRC																		
7703X	18.9	16.75	150	VC	CIRC																		
8201X	14.9	13.57	150	PVC	CIRC																		
8307X			UNK	UNK	CIRC																		
8401X	11.87	9.31	225	VC	CIRC																		
8402X	12.89	10.95	150	VC	CIRC																		
8601X	16.7	14.19	225	VC	CIRC																		

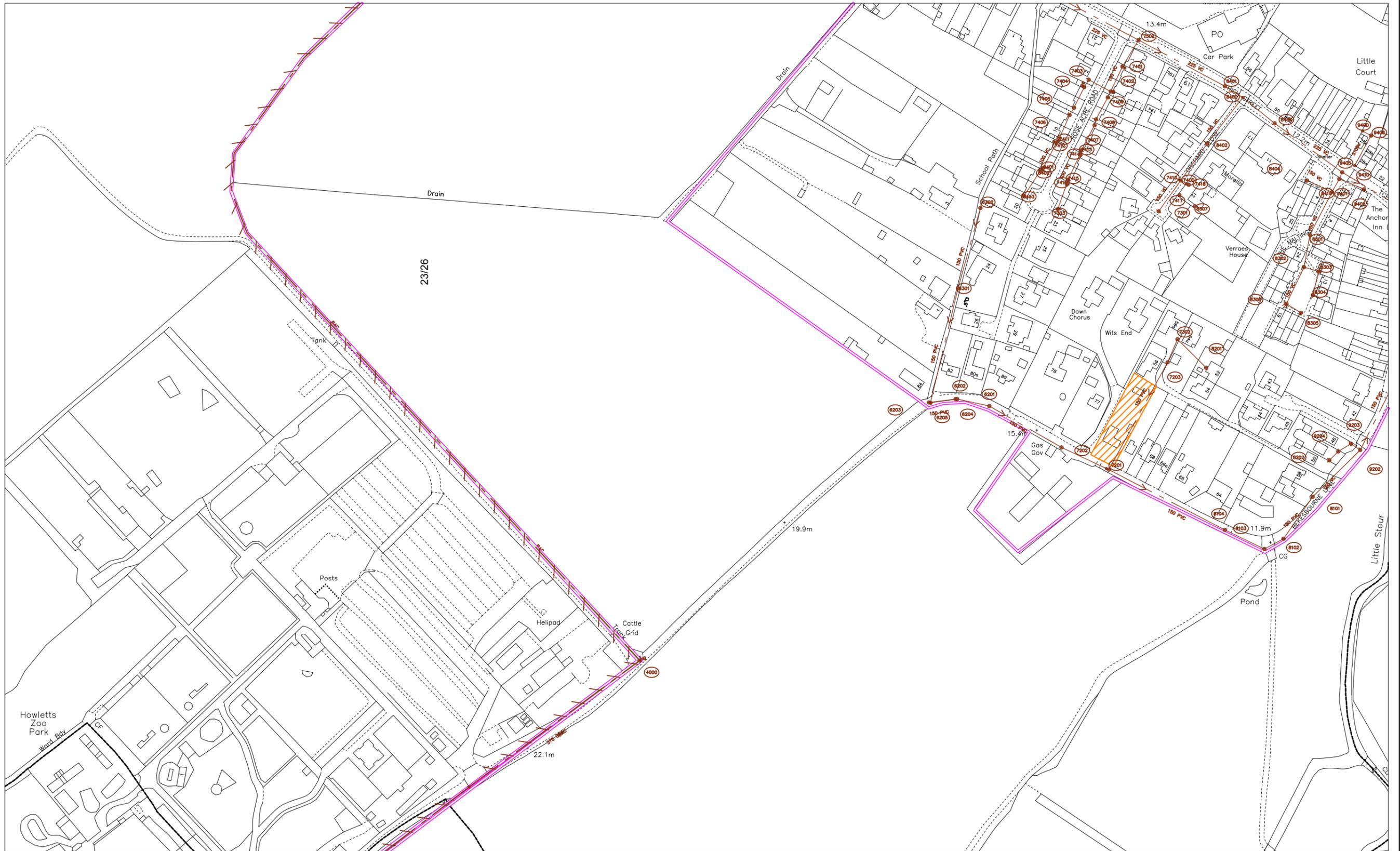
22/26

<p>LINE STYLES / COLOURS</p> <p>Brown: Foul, Foul Siphon Sewer, Foul Vacuum Main, Foul Rising Main</p> <p>Red: Combined, Combined Siphon Sewer, Combined Rising Main</p> <p>Orange: Lateral Drain, Building Over Agreement Area</p> <p>Dark Blue: Treated Effluent</p> <p>Purple: Sludge, Sewer Catchment, Section 104 Area</p> <p>Light Blue: Surface Water, Surface Water Rising Main</p> <p>Yellow: Private</p> <p>Green: Access Shaft, Decommissioned</p>	<p>MATERIALS</p> <p>AK Alkathene, BAC Bonded Asbestos Cement, BRCC Brick (Common), BRE Brick (Engineering), CC Concrete Box Culvert, CI Cast Iron, CO Concrete (In-Situ), CPF Concrete (Pre-Cast), CSB Concrete Segments (bolted), CSU Concrete Segments (unbolted), DI Ductile Iron, GRC Glass Reinforced Concrete, GRP Glass Reinforced Plastic, MAC Masonry in regular Courses, MAR Masonry in random Courses, PE Polyethylene, PF Pitch Fibre, PP Polypropylene, PVC Polyvinyl Chloride, RPM Reinforced Plastic Matrix, SI Spun Iron, ST Steel, VC Vitrified Clay, XXX Other, ZZZ Unknown</p>	<p>LEGEND - SEWERS</p> <p>Manhole (SW), Manhole (F&C), Lamp hole (SW), Lamp hole (F&C), Pumping Station (SW), Pumping Station (F&C), Side entry manhole (SW), Side entry manhole (F&C), Blind shaft (SW), Blind shaft (F&C), Ejector station (SW), Ejector station (F&C), Waterlight door (SW), Waterlight door (F&C), Flushing ch. Mn-e (SW), Flushing ch. Mn-e (F&C), Flushing ch. No-e (SW), Flushing ch. No-e (F&C), Demarcation Chamber</p> <p>Washout (SW), Washout (F&C), Rodding Eye (SW), Rodding Eye (F&C), Gauging point (SW), Gauging point (F&C), Intercept chamber (SW), Intercept chamber (F&C), Storm Tank (SW), Storm Tank (F&C), Vortex chamber (SW), Vortex chamber (F&C), Label @1pse, Dummy/S24 manhole, Backdrop manhole</p> <p>Other (s), Other, Change in sewer (s), Change in sewer, Reflux valve, Flap valve, Cascade, Anode, Valve, Closed Valve, Air Valve, Hatch box (SW), Hatch box (F&C), Direction arrow, Emptying valve, Catchpit, Dambowd, Storm Overflow, Balancing Pond</p>	<p>Wastewater treatment works, Marine treatment works, Outfall headworks, Vent, Vent column, Tidal storage tank, Blank end, Head of Public Sewer, Micro Pumping Station</p> <p>SHAPES (S)</p> <p>A Arched, B Barrel, C Circular, E Egg, H Horseshoe, R Rectangular, S Square, T Trapezoidal, U U Shape, X Other</p> <p>NODE REFERENCING SYSTEM</p> <p>1st digit: hundred metre easting identifier 2nd digit: hundred metre northing identifier sewer type identifier 3rd digit: 0-4 = Foul/Combined, 5-9 = Surface Water 4th digit: next sequential node</p>
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<p>Drawn by: rohandas</p>	
<p>Title: Land off Evenhill</p>	
<p>Date: 19/08/2020</p>	

SEWER RECORDS PAGE 1 OF 2

157535



156957

O.S. REF. TR2057SW	Drawn by: rohandas	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement		
	Scale: 1:2500			
Title: Land off Evenhill_2	Date: 19/08/2020	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.		

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SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
300DX			375	GRC	CIRC																		
6201X	15.92	13.94	150	PVC	CIRC																		
6203X	17.2	15.25	150	PVC	CIRC																		
6204X	16.57	14.49	150	PVC	CIRC																		
6205X	17.21	14.86	150	PVC	CIRC																		
6301X	17.87	16.23	150	PVC	CIRC																		
6302X	17.98	16.63	150	PVC	CIRC																		
6401X	16.1	15.25	100	VC	CIRC																		
6402X	16.22	15.4	100	VC	CIRC																		
6403X	16.49	15.87	100	VC	CIRC																		
7201X	13.94	10.88	150	PVC	CIRC																		
7202X	14.69	12.64	150	PVC	CIRC																		
7203X	14.28	12.05	150	PVC	CIRC																		
7301X	13.42	11.86	150	VC	CIRC																		
7302X	14.48	12.38	150	PVC	CIRC																		
7303X	15.79	14.97	100	VC	CIRC																		
7401X	13.98	12.57	150	VC	CIRC																		
7402X	14.05	12.92	150	VC	CIRC																		
7403X	14.87	13.42	150	VC	CIRC																		
7404X	14.81	13.47	150	VC	CIRC																		
7405X	15.13	13.92	150	VC	CIRC																		
7406X	15.14	14.06	150	VC	CIRC																		
7407X	14.71	13.4	150	VC	CIRC																		
7408X	14.53	13.28	150	VC	CIRC																		
7409X	14.32	13	150	VC	CIRC																		
740DX			UNK	UNK	CIRC																		
7410X	13.14	11.44	150	VC	CIRC																		
7411X	15.67	14.62	100	VC	CIRC																		
7412X	15.78	14.72	100	VC	CIRC																		
7413X	15.02	13.85	100	VC	CIRC																		
7414X	15.15	13.95	100	VC	CIRC																		
7415X	15.44	14.4	100	VC	CIRC																		
7416X	15.6	14.51	100	VC	CIRC																		
7417X			UNK	UNK	CIRC																		
7418X			UNK	UNK	CIRC																		
7502X	13.36	11.29	225	VC	CIRC																		
8101X	11.48	10.12	150	VC	CIRC																		
8102X	11.9	10.26	150	PVC	CIRC																		
8103X	11.98	10.38	150	PVC	CIRC																		
8104X	12.2	10.5	150	PVC	CIRC																		
8201X	14.9	13.57	150	PVC	CIRC																		
8202X	11.31	10.28	150	VC	CIRC																		
8301X	12.08	10.7	150	VC	CIRC																		
8302X	12.27	10.81	150	VC	CIRC																		
8303X	12.08	11.05	150	VC	CIRC																		
8304X	12.07	11.25	150	VC	CIRC																		
8305X	12.05	11.3	150	VC	CIRC																		
8306X	12.1	11.06	150	VC	CIRC																		
8307X			UNK	UNK	CIRC																		
8401X	11.87	9.31	225	VC	CIRC																		
8402X	12.89	10.95	150	VC	CIRC																		
8404X	11.85	11.11	150	VC	CIRC																		
8406X	12.42	9.91	225	VC	CIRC																		
840DX			225	VC	CIRC																		
8410X	11.87	10.5	150	VC	CIRC																		
9202X	11.11	9.93	150	PVC	CIRC																		
9203X	11.18	10.06	150	VC	CIRC																		
9204X	11.3	10.19	150	VC	CIRC																		
9401X	12.1		150	VC	CIRC																		
9402X	12.09	11.43	150	VC	CIRC																		
9405X	12.08	9.54	225	VC	CIRC																		
9406X			UNK	UNK	CIRC																		
940DX			UNK	UNK	CIRC																		

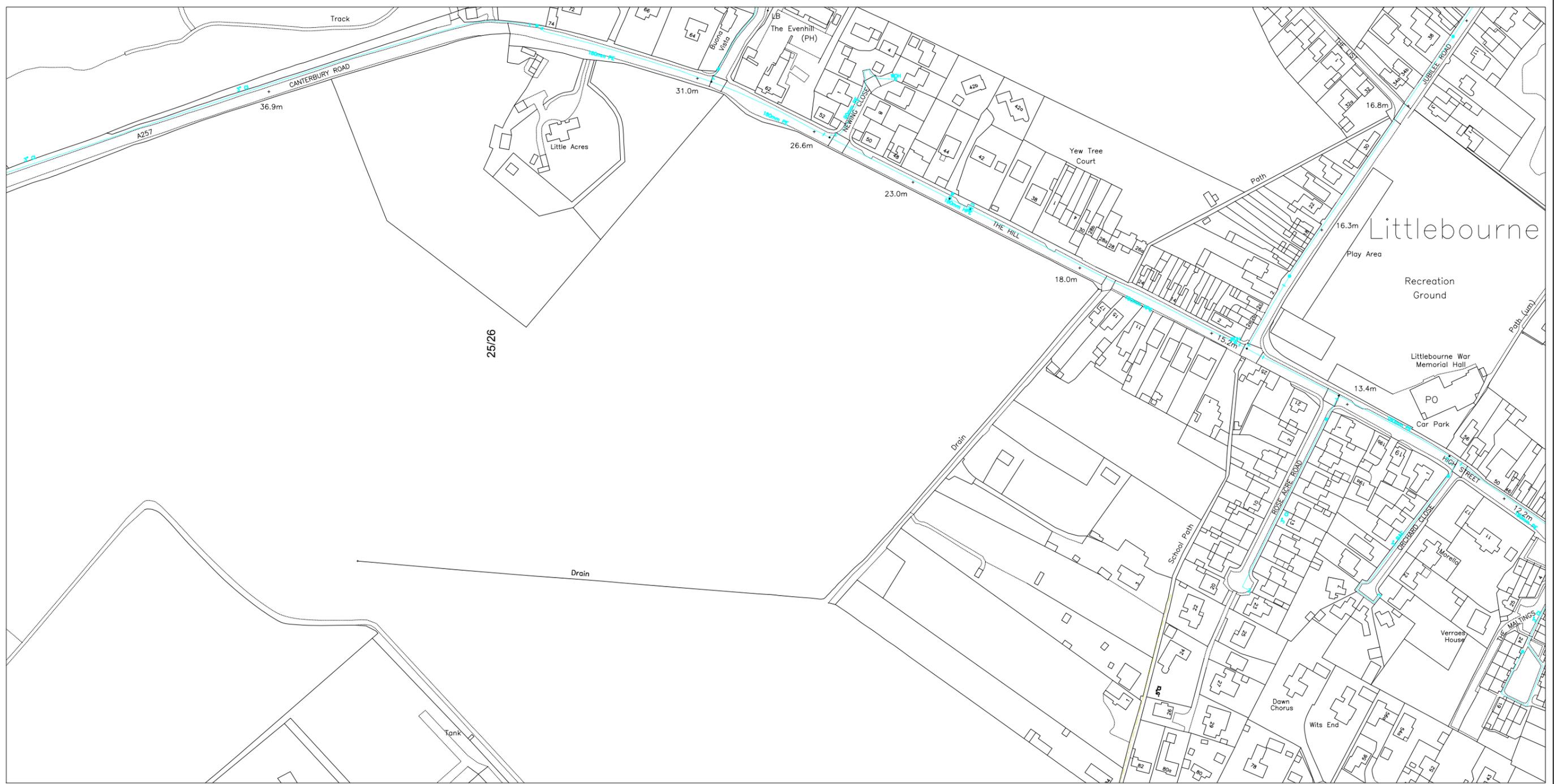
24/26

<p>LINE STYLES / COLOURS</p> <ul style="list-style-type: none"> Brown --- Foul Dark Blue --- Foul Siphon Sewer Red --- Foul Vacuum Main Red --- Foul Rising Main Red --- Combined Red --- Combined Siphon Sewer Red --- Combined Rising Main Orange --- Lateral Drain Orange --- Building Over Agreement Area Dark Blue --- Treated Effluent Purple --- Sludge Purple --- Sewer Catchment Purple --- Section 104 Area Light Blue --- Surface Water Light Blue --- Surface Water Rising Main Yellow --- Private Green --- Access Shaft Green --- Decommissioned 	<p>MATERIALS</p> <ul style="list-style-type: none"> AK Alkathene BAC Bonded Asbestos Cement BRC Brick (Common) BRE Brick (Engineering) CC Concrete Box Culvert CI Cast Iron CO Concrete (In-Situ) CP Concrete (Pre-Cast) CSB Concrete Segments (bolted) CSU Concrete Segments (unbolted) DI Ductile Iron GRC Glass Reinforced Concrete GRP Glass Reinforced Plastic MAR Masonry in regular Courses MAR Masonry in random Courses PE Polyethylene PF Pitch Fibre PP Polypropylene PVC Polyvinyl Chloride RPM Reinforced Plastic Matrix SI Spun Iron ST Steel VC Vitreous Clay XXX Other ZZZ Unknown 	<p>LEGEND - SEWERS</p> <ul style="list-style-type: none"> Manhole (SW) Manhole (F&C) Lamp hole (SW) Lamp hole (F&C) Pumping Station (SW) Pumping Station (F&C) Side entry manhole (SW) Side entry manhole (F&C) Blind shaft (SW) Blind shaft (F&C) Ejector station (SW) Ejector station (F&C) Waterlight door (SW) Waterlight door (F&C) Flushing ch. Mn-e (SW) Flushing ch. Mn-e (F&C) Flushing ch. No-e (SW) Flushing ch. No-e (F&C) Demarcation Chamber Washout (SW) Washout (F&C) Rodding Eye (SW) Rodding Eye (F&C) Gauging point (SW) Gauging point (F&C) Intercept chamber (SW) Intercept chamber (F&C) Storm Tank (SW) Storm Tank (F&C) Vortex chamber (SW) Vortex chamber (F&C) Label @1pse Dummy/S24 manhole Other (s) Other Change in sewer (s) Change in sewer Reflex valve Flap valve Cascade Anode Valve Closed Valve Air Valve Hatch box (SW) Hatch box (F&C) Direction arrow Emptying valve Penstock chamber Damboards Storm Overflow Backdrop manhole Wastewater treatment works Marine treatment works Outfall headworks Vent Vent column Tidal storage tank Blank end Head of Public Sewer Micro Pumping Station 	<p>SHAPES (S)</p> <ul style="list-style-type: none"> A Arched B Barrel C Circular E Egg H Horseshoe X Other R Rectangular S Square T Trapezoidal U U Shape <p>NODE REFERENCING SYSTEM</p> <ul style="list-style-type: none"> 1st digit: hundred metre easting identifier 2nd digit: hundred metre northing identifier 3rd digit: sewer type identifier 4th digit: next sequential node
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Drawn by: rohandas
Title: Land off Evenhill_2
Date: 19/08/2020



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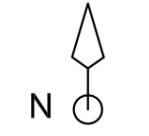
LEGEND - MAINS

	Distribution Main / Communication pipe		Clockwise closing valve		Dialysis machine
	Trunk Main		Fire Hydrant		Break pressure tank
	Raw water main		Washout		Change node
	Non potable		Washout hydrant		Pumping station
	Abandoned main		Meter		Booster station
	Proposed Main		Capped end		Insertion Flow Meter Point
	Fire main		Emptying plug		Water tower
	Non SWS		Stopcock		Service reservoir
	Sluice valve		Leak Noise Correlator Survey Point		Water Supply Works
	Closed valve		Anode		Bore hole / Well
	Air valve		Telemetry cable		Intake
	Butterfly valve		Access point / hatchbox		Customer site
	Pressure reducing valve				Swab insertion point
	Reflex valve				
	Motorised valve				

MATERIALS

Alkathene	AK
Cast iron	CI
Spun (grey) iron	SI
Concrete	CO
Ductile iron	DI
Bonded Asbestos Cement	BAC
Glass reinforced plastic	GRP
Glass reinforced epoxy	GRE
(Unplasticised) Polyvinyl chloride	PVC
Polyethylene	PE
Steel	ST
Concrete segments bolted	CSB
Concrete segments unbolted	CSU
Galvanised iron	GI
Ductile sleeve	DS
Concrete pre-stressed	CPS
High performance polyethelene	HPE
Unknown	??

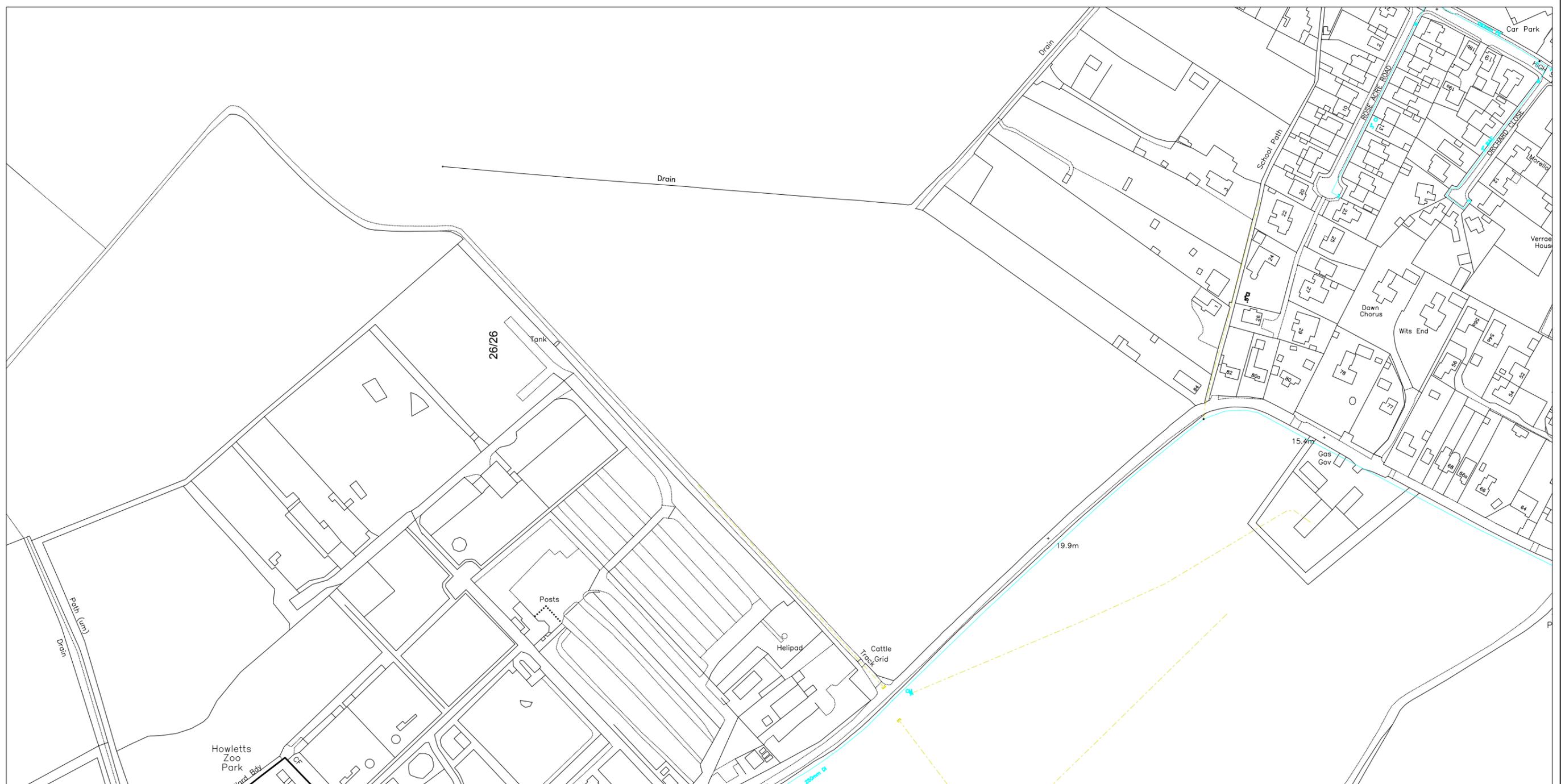
Drawn by:	rohandas	O.S.Ref:	TR2057NW
Scale:	1:2500		
Date:	19/08/2020	TITLE:	Land off Evenhill_1
<p>The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd. accept no responsibility in the event of inaccuracy. The actual positions of pipes should be determined on site.</p>			
<p>Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.</p>			



WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

157512



157027

619874

620837

LEGEND - MAINS

	Distribution Main / Communication pipe		Clockwise closing valve		Dialysis machine
	Trunk Main		Fire Hydrant		Break pressure tank
	Raw water main		Washout		Change node
	Non potable		Washout hydrant		Pumping station
	Abandoned main		Meter		Booster station
	Proposed Main		Capped end		Insertion Flow Meter Point
	Fire main		Emptying plug		Water tower
	Non SWS		Stopcock		Service reservoir
	Sluice valve		Leak Noise Correlator Survey Point		Water Supply Works
	Closed valve		Anode		Bore hole / Well
	Air valve		Telemetry cable		Intake
	Butterfly valve		Access point / hatchbox		Customer site
	Pressure reducing valve				Swab insertion point
	Reflex valve				
	Motorised valve				

MATERIALS

Alkathene	AK
Cast iron	CI
Spun (grey) iron	SI
Concrete	CO
Ductile iron	DI
Bonded Asbestos Cement	BAC
Glass reinforced plastic	GRP
Glass reinforced epoxy	GRE
(Unplasticised) Polyvinyl chloride	PVC
Polyethylene	PE
Steel	ST
Concrete segments bolted	CSB
Concrete segments unbolted	CSU
Galvanised iron	GI
Ductile sleeve	DS
Concrete pre-stressed	CPS
High performance polyethelene	HPE
Unknown	??

Drawn by: rohandas

Scale: 1:2500

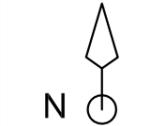
Date: 19/08/2020

O.S.Ref: TR2057SW

TITLE: Land off Evenhill_2

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd. accept no responsibility in the event of inaccuracy. The actual positions of pipes should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.



WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

APPENDIX D

GREENFIELD RUN OFF CALCULATIONS

18 Frogmore Road
Hemel Hempstead
Herts, HP3 9RT



Date 03/01/2023 14:45
File

Designed By EWalker
Checked By

Elstree Computing Ltd

Source Control W.12.5

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	6.300	Urban	0.000
SAAR (mm)	700	Region Number	Region 7

Results 1/s

QBAR Rural	21.4
QBAR Urban	21.4
Q100 years	68.4
Q1 year	18.2
Q30 years	48.6
Q100 years	68.4

18 Frogmore Road
Hemel Hempstead
Herts, HP3 9RT



Date 03/01/2023 14:44
File

Designed By EWalker
Checked By

Elstree Computing Ltd

Source Control W.12.5

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	9.170	Urban	0.000
SAAR (mm)	700	Region Number	Region 7

Results 1/s

QBAR Rural	31.2
QBAR Urban	31.2
Q100 years	99.5
Q1 year	26.5
Q30 years	70.7
Q100 years	99.5

APPENDIX E

DRAINAGE STRATEGY CALCULATIONS

RSK LDE Ltd		Page 1
18 Frogmore Road Hemel Hempstead Herts, HP3 9RT	Littlebourne Northern Basin	
Date Jan '23 File Storage Northern ...	Designed By CW Checked By	
Elstree Computing Ltd		Source Control W.12.5

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	19.022	0.522	9.0	598.7	O K
30 min Summer	19.162	0.662	9.0	786.6	O K
60 min Summer	19.296	0.796	9.0	978.5	O K
120 min Summer	19.419	0.919	9.2	1164.6	O K
180 min Summer	19.482	0.982	9.5	1263.1	O K
240 min Summer	19.520	1.020	9.7	1323.4	Flood Risk
360 min Summer	19.567	1.067	9.9	1398.5	Flood Risk
480 min Summer	19.593	1.093	10.0	1441.6	Flood Risk
600 min Summer	19.607	1.107	10.0	1465.3	Flood Risk
720 min Summer	19.614	1.114	10.1	1476.5	Flood Risk
960 min Summer	19.613	1.113	10.1	1475.2	Flood Risk
1440 min Summer	19.590	1.090	10.0	1437.2	Flood Risk
2160 min Summer	19.552	1.052	9.8	1374.1	Flood Risk
2880 min Summer	19.512	1.012	9.6	1309.8	Flood Risk
4320 min Summer	19.432	0.932	9.3	1184.6	O K
5760 min Summer	19.356	0.856	9.0	1068.5	O K
7200 min Summer	19.283	0.783	9.0	959.8	O K
8640 min Summer	19.212	0.712	9.0	857.6	O K
10080 min Summer	19.143	0.643	9.0	760.5	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	142.333	30
30 min Summer	93.691	45
60 min Summer	58.739	74
120 min Summer	35.557	134
180 min Summer	26.144	192
240 min Summer	20.887	252
360 min Summer	15.196	370
480 min Summer	12.120	488
600 min Summer	10.162	606
720 min Summer	8.796	724
960 min Summer	6.998	962
1440 min Summer	5.062	1220
2160 min Summer	3.656	1592
2880 min Summer	2.899	1996
4320 min Summer	2.087	2820
5760 min Summer	1.652	3640
7200 min Summer	1.377	4464
8640 min Summer	1.186	5272
10080 min Summer	1.045	6048

RSK LDE Ltd		Page 2
18 Frogmore Road Hemel Hempstead Herts, HP3 9RT	Littlebourne Northern Basin	
Date Jan '23 File Storage Northern ...	Designed By CW Checked By	
Elstree Computing Ltd		Source Control W.12.5

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Winter	19.077	0.577	9.0	671.8	O K
30 min Winter	19.230	0.730	9.0	882.6	O K
60 min Winter	19.376	0.876	9.1	1098.5	O K
120 min Winter	19.512	1.012	9.6	1309.5	Flood Risk
180 min Winter	19.581	1.081	9.9	1422.6	Flood Risk
240 min Winter	19.624	1.124	10.1	1493.0	Flood Risk
360 min Winter	19.678	1.178	10.3	1582.9	Flood Risk
480 min Winter	19.709	1.209	10.5	1636.8	Flood Risk
600 min Winter	19.728	1.228	10.5	1669.0	Flood Risk
720 min Winter	19.738	1.238	10.6	1687.3	Flood Risk
960 min Winter	19.744	1.244	10.6	1697.5	Flood Risk
1440 min Winter	19.724	1.224	10.5	1662.6	Flood Risk
2160 min Winter	19.676	1.176	10.3	1580.6	Flood Risk
2880 min Winter	19.626	1.126	10.1	1496.1	Flood Risk
4320 min Winter	19.518	1.018	9.7	1319.0	Flood Risk
5760 min Winter	19.409	0.909	9.2	1149.2	O K
7200 min Winter	19.303	0.803	9.0	989.1	O K
8640 min Winter	19.197	0.697	9.0	836.6	O K
10080 min Winter	19.088	0.588	9.0	686.5	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Winter	142.333	30
30 min Winter	93.691	45
60 min Winter	58.739	74
120 min Winter	35.557	132
180 min Winter	26.144	188
240 min Winter	20.887	246
360 min Winter	15.196	362
480 min Winter	12.120	478
600 min Winter	10.162	594
720 min Winter	8.796	708
960 min Winter	6.998	932
1440 min Winter	5.062	1356
2160 min Winter	3.656	1688
2880 min Winter	2.899	2144
4320 min Winter	2.087	3072
5760 min Winter	1.652	3928
7200 min Winter	1.377	4824
8640 min Winter	1.186	5624
10080 min Winter	1.045	6368

18 Frogmore Road
Hemel Hempstead
Herts, HP3 9RT

Littlebourne
Northern Basin



Date Jan '23
File Storage Northern ...

Designed By CW
Checked By

Elstree Computing Ltd

Source Control W.12.5

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.394	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time / Area Diagram

Total Area (ha) 2.284

Time (mins)	Area (ha)						
0-4	0.571	4-8	0.571	8-12	0.571	12-16	0.571

RSK LDE Ltd		Page 4
18 Frogmore Road Hemel Hempstead Herts, HP3 9RT	Littlebourne Northern Basin	
Date Jan '23 File Storage Northern ...	Designed By CW Checked By	
Elstree Computing Ltd		Source Control W.12.5

Model Details

Storage is Online Cover Level (m) 19.800

Tank or Pond Structure

Invert Level (m) 18.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	990.0	1.300	1772.3

Hydro-Brake® Outflow Control

Design Head (m) 1.300 Diameter (mm) 129
 Design Flow (l/s) 10.7 Invert Level (m) 18.500
 Hydro-Brake® Type Md6 SW Only

Depth (m)	Flow (l/s)						
0.100	4.2	1.200	10.4	3.000	16.4	7.000	25.1
0.200	8.4	1.400	11.2	3.500	17.8	7.500	26.0
0.300	9.0	1.600	12.0	4.000	19.0	8.000	26.9
0.400	8.7	1.800	12.7	4.500	20.1	8.500	27.7
0.500	8.3	2.000	13.4	5.000	21.2	9.000	28.5
0.600	8.3	2.200	14.1	5.500	22.3	9.500	29.3
0.800	8.8	2.400	14.7	6.000	23.3		
1.000	9.6	2.600	15.3	6.500	24.2		

RSK LDE Ltd		Page 1
18 Frogmore Road Hemel Hempstead Herts, HP3 9RT	Littlebourne Southern Basin	
Date Jan '23 File Storage Southern ...	Designed By CW Checked By	
Elstree Computing Ltd		Source Control W.12.5

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	19.159	0.659	10.7	594.9	O K
30 min Summer	19.328	0.828	10.7	779.9	O K
60 min Summer	19.487	0.987	10.7	966.6	O K
120 min Summer	19.629	1.129	10.7	1142.2	O K
180 min Summer	19.697	1.197	10.7	1230.4	O K
240 min Summer	19.736	1.236	10.7	1281.1	Flood Risk
360 min Summer	19.778	1.278	10.7	1336.9	Flood Risk
480 min Summer	19.796	1.296	10.7	1360.9	Flood Risk
600 min Summer	19.799	1.299	10.7	1365.3	Flood Risk
720 min Summer	19.793	1.293	10.7	1357.2	Flood Risk
960 min Summer	19.762	1.262	10.7	1315.9	Flood Risk
1440 min Summer	19.695	1.195	10.7	1227.0	O K
2160 min Summer	19.621	1.121	10.7	1131.9	O K
2880 min Summer	19.554	1.054	10.7	1048.5	O K
4320 min Summer	19.425	0.925	10.7	892.4	O K
5760 min Summer	19.298	0.798	10.7	746.4	O K
7200 min Summer	19.176	0.676	10.7	612.8	O K
8640 min Summer	19.058	0.558	10.7	490.7	O K
10080 min Summer	18.951	0.451	10.7	385.0	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	142.333	30
30 min Summer	93.691	45
60 min Summer	58.739	74
120 min Summer	35.557	132
180 min Summer	26.144	192
240 min Summer	20.887	250
360 min Summer	15.196	368
480 min Summer	12.120	486
600 min Summer	10.162	606
720 min Summer	8.796	724
960 min Summer	6.998	960
1440 min Summer	5.062	1180
2160 min Summer	3.656	1552
2880 min Summer	2.899	1960
4320 min Summer	2.087	2768
5760 min Summer	1.652	3568
7200 min Summer	1.377	4328
8640 min Summer	1.186	5032
10080 min Summer	1.045	5760

RSK LDE Ltd		Page 2
18 Frogmore Road Hemel Hempstead Herts, HP3 9RT	Littlebourne Southern Basin	
Date Jan '23 File Storage Southern ...	Designed By CW Checked By	
Elstree Computing Ltd		Source Control W.12.5

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Winter	19.228	0.728	10.7	668.7	O K
30 min Winter	19.412	0.912	10.7	877.1	O K
60 min Winter	19.587	1.087	10.7	1088.6	O K
120 min Winter	19.744	1.244	10.7	1291.7	Flood Risk
180 min Winter	19.822	1.322	10.7	1396.6	Flood Risk
240 min Winter	19.867	1.367	10.7	1458.6	Flood Risk
360 min Winter	19.920	1.420	10.7	1532.5	Flood Risk
480 min Winter	19.947	1.447	10.7	1570.4	Flood Risk
600 min Winter	19.959	1.459	10.7	1587.4	Flood Risk
720 min Winter	19.960	1.460	10.7	1589.9	Flood Risk
960 min Winter	19.946	1.446	10.7	1569.0	Flood Risk
1440 min Winter	19.877	1.377	10.7	1472.4	Flood Risk
2160 min Winter	19.777	1.277	10.7	1335.5	Flood Risk
2880 min Winter	19.688	1.188	10.7	1218.0	O K
4320 min Winter	19.500	1.000	10.7	982.3	O K
5760 min Winter	19.310	0.810	10.7	759.8	O K
7200 min Winter	19.125	0.625	10.7	558.9	O K
8640 min Winter	18.948	0.448	10.7	382.9	O K
10080 min Winter	18.788	0.288	10.7	235.1	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Winter	142.333	30
30 min Winter	93.691	44
60 min Winter	58.739	74
120 min Winter	35.557	130
180 min Winter	26.144	188
240 min Winter	20.887	246
360 min Winter	15.196	362
480 min Winter	12.120	478
600 min Winter	10.162	594
720 min Winter	8.796	708
960 min Winter	6.998	932
1440 min Winter	5.062	1354
2160 min Winter	3.656	1676
2880 min Winter	2.899	2136
4320 min Winter	2.087	3000
5760 min Winter	1.652	3816
7200 min Winter	1.377	4616
8640 min Winter	1.186	5288
10080 min Winter	1.045	5960

18 Frogmore Road
Hemel Hempstead
Herts, HP3 9RT

Littlebourne
Southern Basin



Date Jan '23
File Storage Southern ...

Designed By CW
Checked By

Elstree Computing Ltd

Source Control W.12.5

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.394	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time / Area Diagram

Total Area (ha) 2.300

Time (mins)	Area (ha)						
0-4	0.575	4-8	0.575	8-12	0.575	12-16	0.575

18 Frogmore Road
Hemel Hempstead
Herts, HP3 9RT

Littlebourne
Southern Basin



Date Jan '23

Designed By CW

File Storage Southern ...

Checked By

Elstree Computing Ltd

Source Control W.12.5

Model Details

Storage is Online Cover Level (m) 20.000

Tank or Pond Structure

Invert Level (m) 18.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	750.0	1.500	1445.6

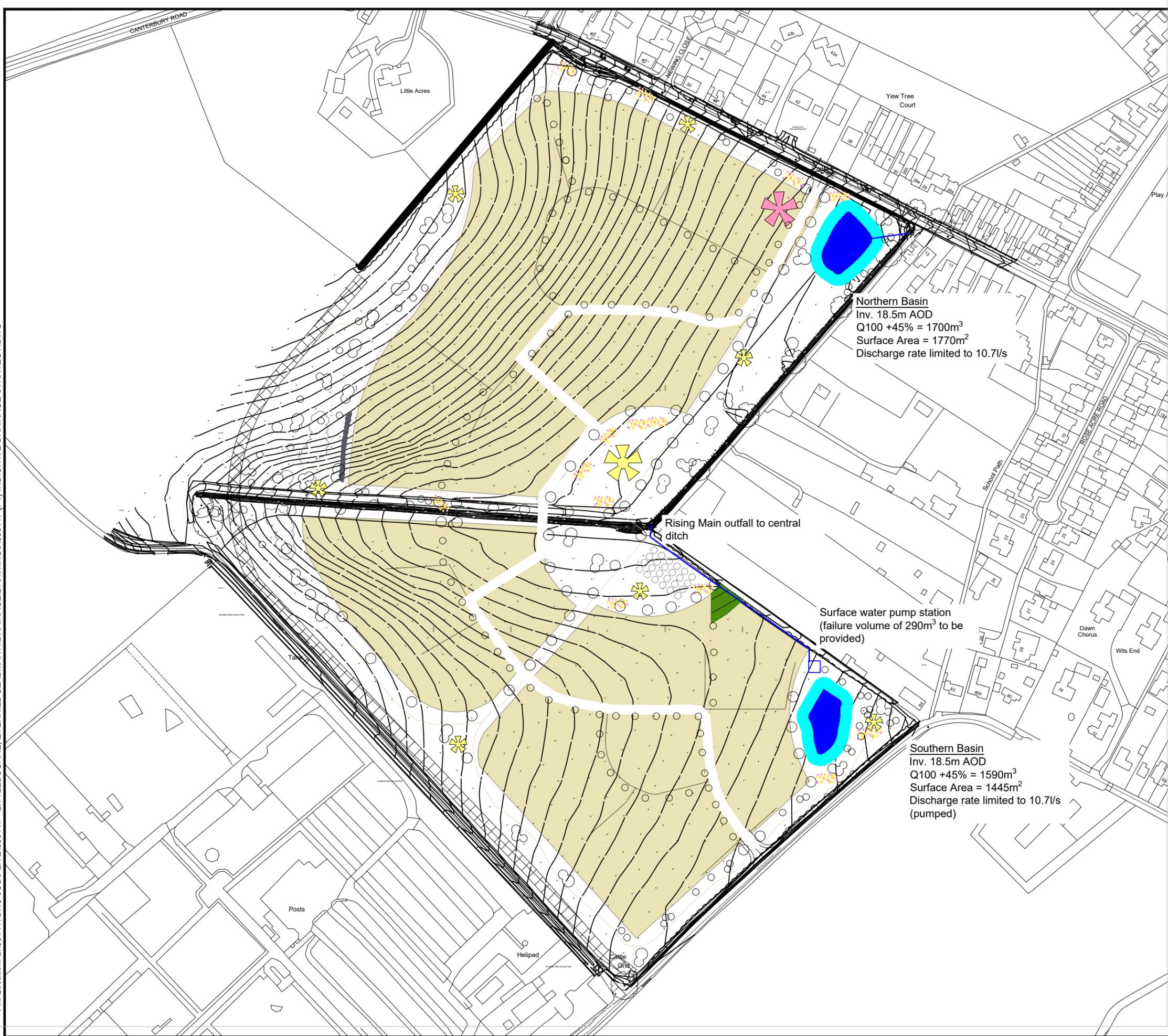
Pump Outflow Control

Invert Level (m) 18.500

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	10.7000	1.500	10.7000

APPENDIX F OUTLINE SURFACE WATER DRAINAGE STRATEGY DRAWING

File Location: L:\1001-HYDRO JOBS LIVE\680117 - LITTLEBOURNE, EVENHILL, GLADMAN\4. DRAINAGE\DRAWINGS\680117 (P1) INDICATIVE DRAINAGE STRATEGY.DWG



Northern Basin
 Inv. 18.5m AOD
 Q100 +45% = 1700m³
 Surface Area = 1770m²
 Discharge rate limited to 10.7l/s

Surface water pump station
 (failure volume of 290m³ to be provided)

Southern Basin
 Inv. 18.5m AOD
 Q100 +45% = 1590m³
 Surface Area = 1445m²
 Discharge rate limited to 10.7l/s
 (pumped)

Rising Main outfall to central ditch

Notes
 Do not scale from this drawing
 Layout provided by CSA
 Drawing is indicative and subject to change following layout revisions
 Drawing is subject to change following detailed design

Key
 Attenuation basin
 Surface Water Pipe

Rev.	Date	Amendment	Drawn	Chkd.	Appd.
P1	04.01.23	Outline Drainage	CW	KJ	CW

LDE 
 CIVILS | STRUCTURES | HYDROLOGY
 an rsk company

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 Email: info@rsk.co.uk
 Web: www.rsk.co.uk

Client
Gladman Developments Ltd

Project Title
The Hill Littlebourne

Status
Draft

Drawing Title
Outline Surface Water Drainage Strategy

Drawn	Date	Checked	Date	Approved	Date
	Jan 23		Jan 23		Jan 23

Scale	Orig Size	Dimensions
Not to Scale	A3	m

Project No. **680117** Drawing File

Drawing No. **10-01** Rev. **P1**